

THE IRON AGE

New York, October 31, 1929

ESTABLISHED 1855

VOL. 124, No. 18

Output Regulated by Simple Plan

Inexpensive Method of Controlling Flow of Materials
in a Forging Plant Reduces
Production Costs

FOR the relatively small company making a multitude of parts, close control of production to keep stocks within normal bounds is just as important as for the large company. When the number of parts is several hundred, the matter of controlling stocks becomes acute and calls for rigid supervision. To solve this problem in a simple yet effective way has been the achievement of the Kilborn & Bishop Co., New Haven, Conn., manufacturer of drop forgings.

Making close to 500 different parts, the company has found it advantageous from the standpoint of costs to eliminate, so far as possible, the keeping of elaborate records. Cluttering of the office files with innumerable cards and record sheets serves no good purpose. It occupies the undivided time of one or more clerks and in many cases means duplication of effort without tangible benefits.

After experimenting over an extended period with the trial and error method, the Kilborn & Bishop Co. has devised a system which is simple but adequate, inexpensive but profitable. It centers about what is termed a "supply and demand sheet," which is equivalent to a perpetual inventory of material in the plant. A separate sheet is used for each individual article made by the company. In the first column are recorded production orders or purchase orders for material bought from an outside source. The figures in this column give a running grand total of the production or purchase orders for each part during the fiscal year, which consists of the 12-months' period from one annual inventory to the next.

Data Regarding Outside Purchases Recorded

In the second and third columns, designated "invoiced" and "received" respectively, are kept data regarding outside purchases, the date of the invoice and the date that the material was received. These columns are not used for production orders going through the company's own

MORE than 95 per cent of the manufacturing establishments in the United States employ less than 250 men, in numerous cases as few as from 25 to 50. Many of them produce a variety of articles and consequently their problems of production and stock control are similar in various respects to those of larger plants. This article, setting forth the plan successfully used by a company employing about 25 men and turning out over 500 different products, should be of special interest to the small manufacturer.

shop. When material reaches the finished stock room, whether it comes from an outside source or from the shop, the information is entered in the fourth column marked "to stock." Each day's cumulative orders for each part are recorded in the fifth and sixth columns, which are headed by the title "sales." Incidentally, these two columns do not tell the size of individual orders or where each order is going, this information being given on another sheet.

The total of ordered parts (obtained from the first column) minus the total of parts in the finished stock room (fourth column) gives the number of parts in process. This, of course, is based on the assumption that all of the parts ordered have already been started through the shop. The stock total (fourth column) minus the sales total (fifth or sixth column) gives the number of finished parts in stock available for sale.

At the top of the sheet, opposite "date and source," are given the name of the company from which outside purchases have been made and the date the first order was placed with that source of material. The serial number of the part, its name, size and finish are put at the bottom of the sheet. The "minimum" for the part also is recorded. By "minimum" is meant the minimum amount of each part that should be kept in finished stock, this figure being derived by multiplying the total sales of that part for one month by the number of months necessary to produce or procure from an outside source that particular part, for obviously it is essential to keep on hand in finished stock enough parts to supply customers for that period.

Every time the "available for sale" amount falls below the minimum, the "supply and demand sheet" is scanned to determine whether a new minimum should be set. Here the sales record is the guide. For instance, if 300 units of a part are the average monthly sales, and two months are allowed for replenishing stock, the minimum would be 600

When the number "available for sale" is below the minimum, a signal is attached to the center of the card. In an emergency, when there actually is a shortage and stock at hand is not sufficient to fill orders (that is, the "available for sale" is a minus quantity or the sales are greater than the stock), the signal is put at the right side of the card. Ordinary paper clips are used for danger signals. The company believes that clips are the cheapest and easiest article to employ for this purpose.

When a card is started for a new part, in the "ordered" column is placed the total supply available or soon to be available, which includes the number in finished stock, the number in process and the number on production orders on which manufacture has not yet begun. As each production order is issued, the number of parts on that order is added to the total already in the ordered column. In the "to stock" column is entered the number in stock and each delivery to stock is added. In the sales column the number of unfilled shipping orders is first entered and then every additional order received by the sales department is added.

Any red entries on the sheet are of a negative char-

[illegible]

If the minimum plus sales is greater than the number of parts in stock, the stock is low and deliveries from the production department to the stock room are closely watched. On the other hand, if the minimum plus sales is greater than the number of parts ordered, more stock must be ordered from the production department. During the first two months of the current fiscal year, the monthly sales average from the previous year is used to determine the minimum. At the end of that period, however, a new

acter. In the stock column they are goods which for any reason have been returned from finished stock to the shop. Red in the sales column is the sign of either a cancellation or a returned shipment. Only in these few cases is there any subtraction on the sheet. One of the main purposes in originating the sheet was to get away from subtraction, in which tests have proved that employees make far more errors than in addition.

To keep track of material in process between the

time it is entered in the "ordered" column and in the "to stock" column, a tracing sheet has been provided. One tracing sheet is used for each production order. However, if a second order for the same part is issued before the first is completed, the information is put on the same sheet. Data contained on this sheet include the names of the various operations in manufacturing the part, the piece-work price (if any), operator's clock number and date worked, number of pieces on which operator worked and time consumed in doing the work.

The total sums from the tracing sheet are transferred for filing purposes to a rate card which contains condensed information about the rates of the various operations in producing the parts. The time for making forging dies and other tools, fixtures and repairs also is tabulated.

The shop production schedule is usually decided upon by the chronology of orders. However, the matter of giving precedence to special orders is determined by an informal conference of the sales manager, general manager and shop superintendent. All parts are manufactured in accordance with instructions on a general production plan sheet, which lists the order in which various operations are to be done. One copy of the plan sheet goes to the shop and one is kept on file in the office. There is a plan sheet for each part.

Annually in July a physical inventory of materials is taken. The stockkeeper in charge of the stock room makes an actual count of finished parts and puts the record for each part on a separate inventory card, which is sent to the office. The cards are sorted according to general ledger accounts, the sum totals of the general ledger groups being transferred to inventory ledger sheets.

In the matter of inventories, the fundamental rule of the company is to calculate each part of the annual statement to the same degree of accuracy as every other part. For example, it is regarded as distorting values to determine within a few cents the worth of a lot of material totaling possibly \$5 when it is a matter of judgment whether a machine costing \$1,000 shall be depreciated \$50, \$100 or \$150. The company is of the opinion that any item appraised within 5 per cent of its actual value for inventory purposes has been calculated closely enough.

In these cases the theory that all errors are compensatory is followed. Thus, if all errors are within 5 per cent of the actual value, the average of the grand total of the inventory would be within $\frac{1}{2}$ per cent.

When parts are rejected by inspectors or pieces are spoiled in production departments, a scrap report is filled out and sent to the office for perusal by the management. The report contains the die number, last operation on the piece, quantity, order number, reason for scrapping and the name of the inspector who was responsible for scrapping the material. The operators know that a report of all scrapped material goes to the office and consequently the psychological effect is beneficial.

Orders for special forgings are handled in a slightly different manner than orders for stock items. The tracing sheet and the rate card are retained, but instead of the supply and demand sheet a master card is kept. It contains the customer's name and address, description of the forging, die number, size and weight of stock, size and quality of die blocks, finished weight, order number, date, quantity price and material cost. A separate card is used for each special part.

The entire system has been designed to handle periodic production of the same pieces and from it many benefits have accrued. Complete information regarding production control and the rate of operations is tabulated on three sheets: the supply and demand sheet, tracing sheet and rate card. In fact, the tracing sheet is only of temporary service, as it is filed after the totals have been transferred to the rate card and is seldom referred to later.

From an inspection of previous sales, as reflected by the "minimum" figure on the supply and demand sheet, the management can tell instantly at what rate the shop should turn out any given part at any given time. The system also reveals at all times what the shop has been asked to produce, what it actually has produced and what amount the sales department has sold. Moreover, it shows the rate of production on all previous orders, a matter essential in determining manufacturing costs. It sets forth the facts necessary for the management to operate its business intelligently and accomplishes efficiently what much more elaborate systems often fail to achieve.

Money Rates as a Business Forecaster

MAJOR swings in money rates have forecast accurately, many months ahead, the major fluctuations of business activity for 1927, 1928 and 1929—and, it might be added, for every year since the war, says Alvan T. Simonds, president, Simonds Saw & Steel Co., Fitchburg, Mass., in *Looking Ahead* for Nov. 1.

Using major swings in commercial paper rates as a business forecaster, it was evident at the beginning of 1927, he asserts, that 1928 would probably be a year of revival. This forecast was corroborated as the decline in 1927 developed and continued to the end of the year and as money rates moved lower all through the year (1927), making for a rise in business activity in 1928. Similarly, at the beginning of 1928 money rates began to move up and continued upward through that year and the greater part of 1929, indicating that the cyclical peak of business activity would come in the first half of 1929 and would be followed by a falling off.

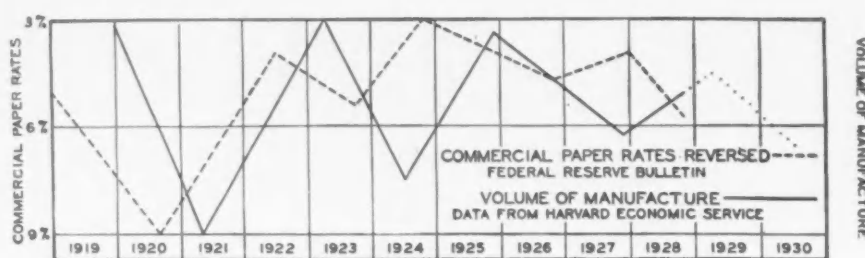
Since the war

rising money rates have been followed, after a long lag, by declining business and easing money rates have been followed, after a similarly long lag, by improving business. The long lag is seldom recognized, says Mr. Simonds. Business in the United States is too big, its inertia is too great, to be stopped and turned in a different direction at once—indeed, it requires months.

On this basis Mr. Simonds believes that the next major upswing in business activity will begin nine to 15 months after the approaching turndown in money rates.

He also calls attention to the fact that each major falling off in business since the war has been less severe than the previous one. The recession of 1927 was briefer and less severe than that of 1923-1924.

The recession of 1923-1924 was decidedly less severe than the depression of 1920-1921. Emotional pessimism would now be a mistake, in Mr. Simonds' view, since it would help to increase any recession of business that may be ahead.



The Curves for Commercial Paper Rates (Reversed) and Volume of Manufacture Show Correlation, But There Is a Lag Between Them

Heat Treats Stainless Steel Tubes

British Firm Forms Soft Strip into Tubing and Draws
It Through Pair of Dies with Electric
Furnace Between

SINCE 1924 Boulton & Paul, Ltd., Norwich, England, has been engaged on research, design and constructional work for the Air Ministry in connection with the giant airship R-101 (described in considerable detail in *THE IRON AGE*, June 27, page 1753). In this time the firm has successfully developed new types of members, materials and methods of manufacture. In the latter part of 1924 two experimental longitudinal girders were constructed of the type ultimately adopted for the ship, incorporating several patented features, in particular the use of the process for continuously heat treating steel members after forming, and embodying the results of the research work on structural stainless steel which had been under way for a year or so previously. It was this work which rendered possible the use of stainless steel for airship construction.

For many years aircraft practice in Great Britain had been to form the required section from the already hardened and tempered strip, the forming being carried out either by rolling or drawing. These operations involved shaping the strip only, and not a reduction of thickness. It was realized, however, that this method of forming would not be particularly suitable for large scale production owing to the facts that

(a) The strip used, which had been hardened and tempered in the coil, was not uniform in its mechanical properties along its length; hence the "spring back" from the roller die was not consistent. This resulted in uneven sections being produced at the first pass, and often the irregularity was so marked that the section had to be passed through dies several times to make it more uniform.

(b) The design of sections was limited by the ductility

or lack of ductility of the hardened and tempered strip.

To avoid these disadvantages there was developed a method of working the softened strip and, after having completely formed it to the requisite shape, carrying out the hardening and tempering by a continuous process.

Solid drawn tubes were not and are not now available in the material, size and mechanical properties required for the airship, viz., to quote one item: 1½-in. tubes in metal ranging from 26 to 20 gage, length up to 47 ft., and having a minimum proof stress of 145,000 lb. per sq. in. The above process therefore, then in its early stages of development, was the only method of providing the required sections. The fact that quantities like 30,000 ft. of 1½-in. tube for longitudinal girders have been produced shows that the method is a practical one for production working.

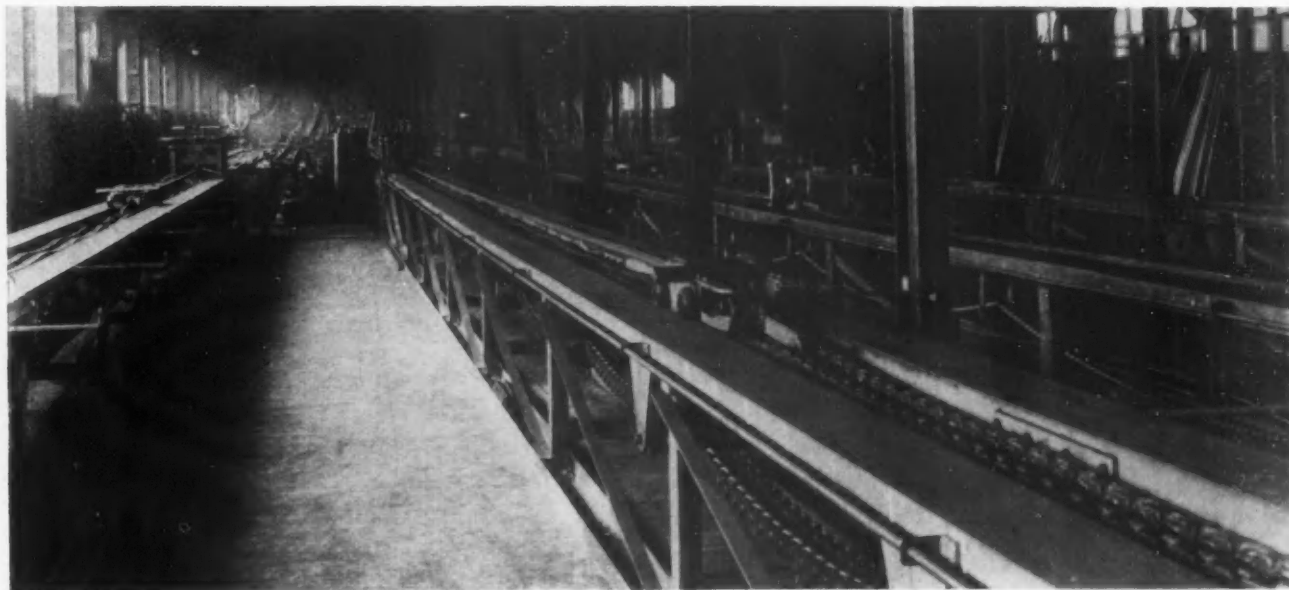
Plant for Fabricating Shapes

The actual plant used for the manufacture of the airship section comprises four drawbenches, shown in an accompanying illustration, each 70 ft. long, two rolling machines, one strip cutter and one section cutter.

The drive of the drawbench is through a friction disk so that a variable speed of pull is obtainable, which is also capable of being very gradually changed. Dies are held in special holders fitted to the drawbench channels and definitely locked in position by a downward moving head operated by a hand wheel.

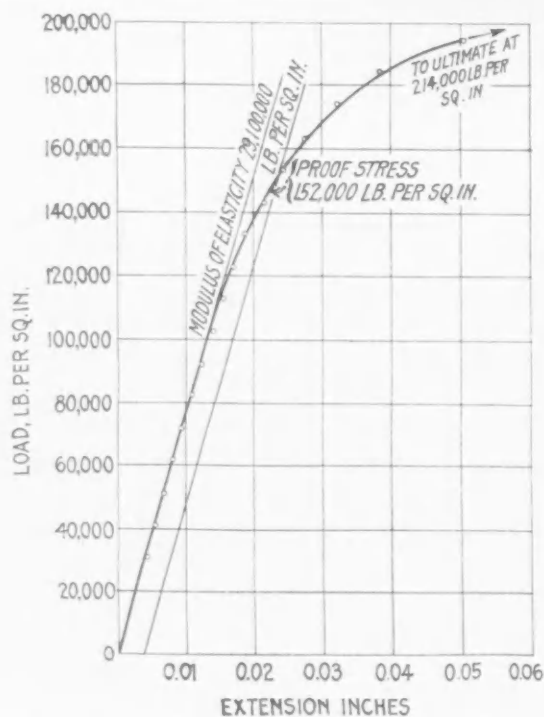
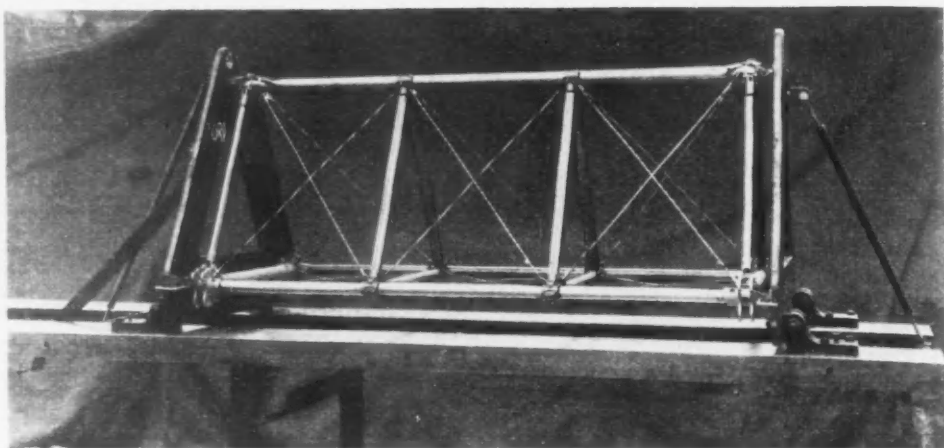
Speed is controlled from the die head end of the bench by means of a push rod, so that the operator setting the dies can readily control the speed of the chain.

Each drawbench may also be fitted with an electric fur-



General View of the Four Drawbenches at Boulton & Paul's Norwich Works, Which Were Used in Forming Sections for the Airship R-101

FRAME Longitudinal in Assembly Jig. This member is made of stainless steel tubing with closed joints, the ends entering special fittings, and with diagonals of high tensile wire



Stress Strain Curve for Heat-Treated Stainless Steel Strip. Hardened from 980 deg. C., tempered at 550 deg. C.

Chemical Composition:	
Carbon	0.19 per cent
Silicon	0.41 per cent
Manganese	0.27 per cent
Chromium	13.9 per cent
Nickel	0.22 per cent

nace at the die holder end and also, as speed of drawing is of vital importance when the section is being either hardened or tempered, a speed indicator is attached to each bench.

Drawing of Section

Sections such as the 1 $\frac{3}{4}$ -in. tubes used for the longitudinals are made entirely on the drawbench. The flat strip, in its softened condition as received from the makers, is passed successively through a series of dies until the desired shape is obtained. It should be noted that these drawing operations merely form the strip to a particular shape and that the gage of metal remains constant throughout the whole process.

For close jointed tubing (such as is shown in the frame longitudinal) the necessary corrugations are first formed along the edges by drawing the strip through dies and then the whole bent to curved shape. The final seaming is carried out by pulling this section through a circular die and over a mandrel shaped so as to fold the corrugated edges over one another.

A 70-ft. tube can thus be formed easily; all work is carried out while the steel is in annealed condition.

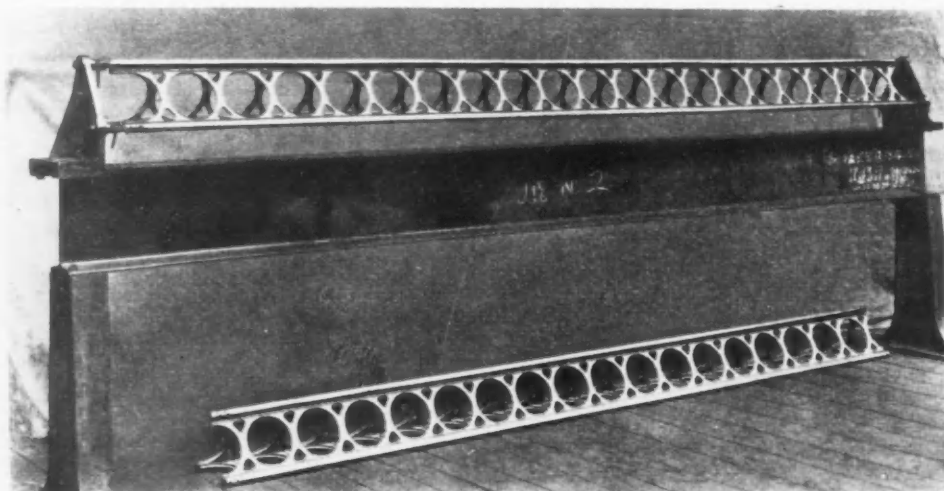
Physical Properties of the Steel Used

Stainless steel strip of a composition within the limits indicated below has been used for all members such as close jointed tubes, which are formed on the drawbenches and hardened and tempered by the Boulton & Paul continuous heat treatment process:

Carbon	0.16 to 0.22 per cent
Silicon	Not exceeding 0.5 per cent
Nickel	Not more than 1.0 per cent
Chromium	12.5 to 14.0 per cent

It has been found that steels in this range, after hardening from a temperature of 960 to 1000 deg. C. and tem-

RIDGE Girder in End - Fitting Jig. Stainless steel tubing with open joints is used at the angles, riveted to duralumin webs, flanged around all openings so as to combine lightness and stiffness



pering at a suitable temperature, have the following mechanical properties:

Proof stress Not less than 145,000 lb.
 Ultimate stress 200,000 to 215,000 lb. per sq. in.
 Close bend (transverse) Around pin three times the thickness

A typical stress-strain diagram is shown in Fig. 4.

Proof stress is defined as that stress at which the stress-strain diagram departs from the straight line of proportionality by 0.1 per cent of the gage length.

The Continuous Heat Treatment Process

As before remarked, each of the 70-ft. drawbenches may be equipped with a wire-wound electric tube furnace, fitted with automatic temperature control. When heat treating is to be done on fully formed sections, one such furnace is brought up to heat, say 50 deg. above the correct temperature for the steel, and a die set up on the entry side of the furnace of such size that there is a little

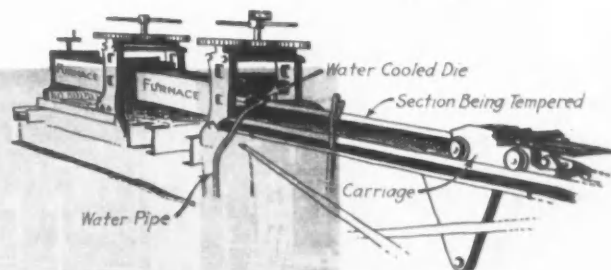
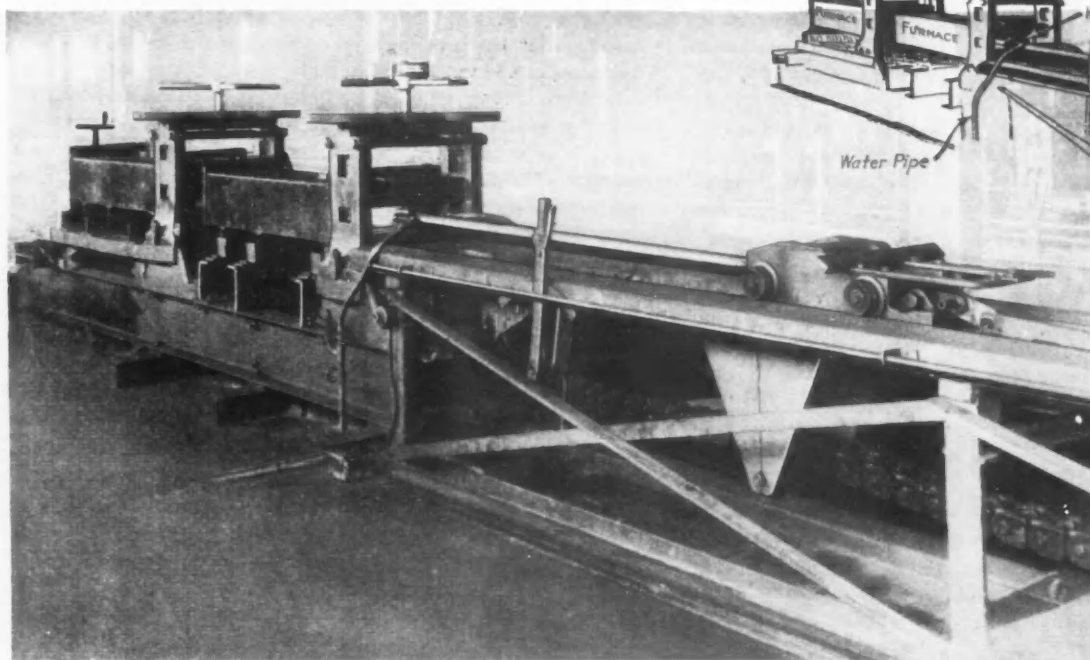
Formidable practical difficulties were encountered in the hardening of stainless steel in the early days, due principally to two things:

- (1) The high hardening temperature, 960 to 1000 deg. C.
- (2) The comparatively slow and variable response to heat treatment of the stainless steel used

However, a few miles of strip in this difficult steel have now been successfully and uniformly heat treated in equipment such as shown in one of the illustrations. But this has been achieved only by the closest attention to every detail, involving

- (1) Very close knowledge of the composition and micro-structure in the annealed state of the strip to be treated
- (2) Close control of temperature
- (3) Close control of rate of feed through the muffles

The tempering operation is very similar to the hard-



CLOSE - UP
 of Die
 Holders on
 Drawbench Ar-
 ranged for Tem-
 pering Tubes
 for Airship
 Booms. Note
 how rigidly the
 dies are held in
 adjustable
 fixtures

friction offered to the passage of the section through it.

Full lengths of the formed section, such as close jointed tube, are then fed through at a rate which is dependent upon

- (1) The nature of the operation—whether hardening or tempering.
- (2) The class of steel.
- (3) The form of the section.
- (4) The gage of the strip from which the section was formed.
- (5) The mass of steel per linear foot.

The section is raised in temperature and soaked at least two minutes at the hardening or tempering temperature before emerging into the air. After traveling in air a few inches, the section enters a cast iron water cooled die (set in the die holder of the drawbench) which completes the cooling and maintains the section in its correct shape. What really happens in the hardening operation is an air quench; the section has cooled through its critical range before reaching the water cooled die. An air hardening steel must therefore be used. The first die, ahead of the furnace, merely maintains sufficient tension on the section while in the furnace to insure straightness in the finished product.

ening described above, with, of course, a suitable adjustment of temperature. For most of the stainless steel used for the airship a temperature between 420 and 450 deg. C. has been used. In order to speed up the rate of drawing two furnaces are put in tandem on one bench for this operation.

Uniformity of the Product

The product is more uniform than has been found in steel strip hardened and tempered in the coil. Coil treated strip often showed a variation of as much as 50,000 lb. per sq. in. in the tensile strength along a length of 60 ft. As typical of the continuous process, a 50 ft. close jointed tube in stainless steel made in the above manner was taken at random and cut into short test lengths. The size was 1 3/4 in. by 20 gage, i. e., most difficult from the heat treatment point of view. The tests fell within the following range:

Proof stress 145,000 to 154,000 lb. per sq. in.
 Ultimate strength 198,000 to 208,000 lb. per sq. in.
 Transverse closed bend 2 3/4 to 3 thickness

Control Tests on Heat Treated Sections

Rockwell hardness tests and close bend tests are carried out on each end of every section after cutting to

length (an allowance being made on the length for test purposes).

With the difficult steel used, direct correlation between the Rockwell machine and the testing machine is realized by furnishing the Rockwell machine with tensile test pieces which have been pulled for proof stress and ultimate stress. It is necessary to supply such test pieces representing every cast of steel used, every gage of strip and every annealing heat (by strip rollers).

The special character of the steel is responsible for the multiplicity of the comparison standards.

Special combinations of loading and penetrators of the

Rockwell machine are necessary for dealing with very thin strip, such as 26 to 30 gage.

Cutting to Length

These hardened and tempered sections are cut by means of a mild steel disk, about 16-gage thick, running at high speed. It is found that this method is quick and very economical.

The machine carrying the disk is fitted with a quick clamping device on a moving table, and by the turning of a handwheel the disk is brought in contact with the section.



Germany Extruding Seamless Tubes of Stainless Steel

MARKED developments in the making of seamless tubes in Germany were reported in an address at Akron, Ohio, Oct. 23, before a sectional meeting of the American Society of Mechanical Engineers, by Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh.

The Mannesmann Tube Co., he says, extrudes seamless tubes up to 3 in. in diameter, and what is more, of stainless steel. Each tube is extruded vertically downward by means of a 4000-ton press at high speed (a 25-ft. tube in 1 sec.), is moved sideways and is cut out of the die by a rotary knife. Nothing is said, he added, about the material of the dies. They are air cooled between operations, and are similar to the mandrels of our present-day seamless mills, as far as heat action is concerned.

The Pilger mill, Professor Trinks finds, no longer reigns supreme. This mill, which received its name because the pilgrims on the way to Andernach walked five steps forward and three steps backward, "wears out of true quickly and is therefore quite well adapted to small orders of different size, which require frequent roll changing anyway, but is not suited to large orders. German engineers and manufacturers realize this situation and are therefore following our lead. They state that for seamless tubes of 3 to 6 in., single piercing and an automatic mill are correct, and that for 6 to 10 in. or 11 in., so called double piercing is correct. For 12 to 24 in. double piercing and expanding is recommended."

Has Mandrel in Tension

Several expanding mills, it appears, are being developed. The Mannesmann company has a mill which is similar to the Stiefel expanding mill, but uses a tension mandrel instead of a compression mandrel. It is claimed that the compression mandrel, due to vibration of the mandrel rod, produces a pipe of variable diameter, which requires much reeling. The tension mandrel is claimed to be free from this trouble. The Deutsche Maschinen Fabrik is likewise developing a new expanding mill.

He mentioned a new piercing mill, which has two rolls on each side to take the place of the present piercing mill roll, so that there are four rolls, all told; two rolls form the converting part of the pass, while two other rolls form the diverging part of the pass. Up to the present time, he added, only small sample tubes have been rolled, and German mill engineers doubt the usefulness of this design for commercial tubes.

Pipes, boiler drums, and reaction chambers of more than 24-in. diameter are either hollow-forged, or welded or rolled by a new process. He said boiler drums are frequently welded of two half shells and that the boiler makers are allowed 90 per cent of the strength of an integral shell, whereas here in the United States such procedure is prohibited under the boiler code of the American Society of Mechanical Engineers. The welded shell is turned and bored, and tested hydraulically. Then the

ends are wedged down, and the drum is tested once more under hydraulic pressure.

Rolling from Large Hollow Ingots

He agreed that the cost of welding sections three or more inches thick is high. Accordingly, "one steel works has developed a process in which ingots are cast hollow over a collapsible core. The hollow ingots are then elongated by means of a special rolling mill which applies a number of small rolls, say six, on the outside and an equal number of rolls on the inside of the hollow ingot. The rolls are designed for great elongation and are set slightly on a skew so that they both rotate and feed the ingot forward. Seamless tubes up to 40 in. in diameter and 30 ft. long have been rolled by this process.

In making the molds for the hollow ingots, a new core material is used which costs only 1c. a lb. but is limited to 4½-in. thickness of ingot wall. For similar purposes another core material has been developed which consists of aluminum oxide with some aluminum nitride (to act as a binder). It can be used for any wall thickness. The same material is also used in Germany as a wash for cores of steel castings and is claimed to have reduced the cost of cleaning castings by more than 50 per cent.

One of the most striking fruits of X-ray investigation is the recognition of the somewhat complex cell structure which exists in certain alloy bodies which are commonly described as intermetallic compounds, said Dr. Walter Rosenhain, in an address before the recent meeting of the British Institute of Metals. A large amount of further work remains to be done before this question can be cleared up. Closely allied to this problem is the question of the real nature of the complex structure found in certain pure metals, notably manganese, which displays a striking similarity to the structure of the peculiar intermetallic combinations previously mentioned. It would appear that the underlying laws of intermetallic combination have yet to be discovered, and that the true nature of intermetallic compounds and the features which distinguish it, if a true distinction exists, from a solid solution, have yet to be accurately defined.

Three rare metals are interestingly discussed in an attractive and well illustrated booklet of 58 pages issued by the Fansteel Products Co., Inc., North Chicago, Ill. The three metals are tantalum, tungsten and molybdenum, and their history, properties and uses are discussed. About 15 pages are devoted to "Tantalum, the Everlasting Metal"; about 10 pages to "Tungsten, the Metal of Another World," and 6 pages to "Molybdenum, the Metal of Radio." A concluding section of about seven pages deals with facts and figures on rare metals.

Modern Electrical Repair Shop

Steel Mill Requirements in Keeping Its Many
Motors in Active Service—Should
Not Manufacture Parts

BY J. M. ZIMMERMAN*

ON building a new repair shop a steel mill purchased some \$30,000 worth of modern equipment. A great deal of thought was given to the layout of this shop and its system of costs. It is now operating, with an enviably low maintenance cost.

In laying out a modern electric repair shop all lost motion in man-hours may be kept low by proper arrangement of the shop. The places to which the workman must have access while performing his tasks—tool and stock disbursement window, time clerk's window in foreman's office, and washroom—should be located centrally, where his coming and going will not interrupt the workmen in other groups.

With this in mind the foreman's office is in the center of one wing of the building, with the washroom on one side and the storeroom and toolroom on the other. The stock and tool disbursement window is as near the foreman's office as is convenient, so that it will be near the center of the building. The stores office is in the corner

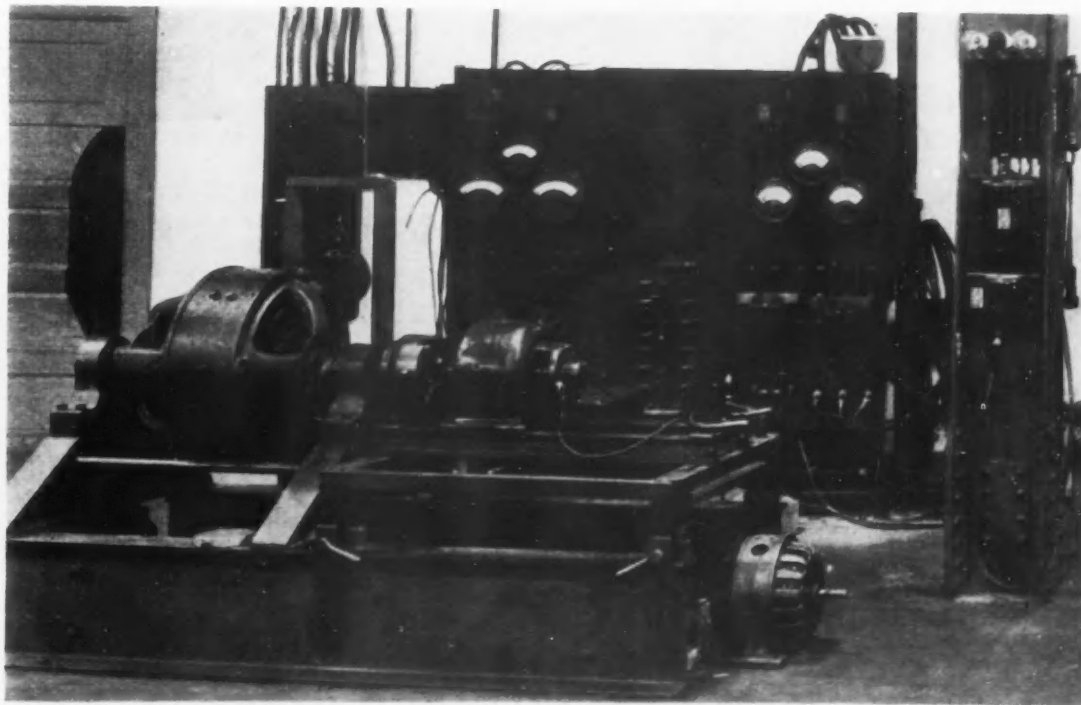
of the storeroom, next to the foreman's office, but is not connected to it except by a window through which the necessary clerical work passes. The receiving door is at the far end of the storeroom.

If the roof of the building is high enough the space above the foreman's office and the washroom can be utilized to store parts, such as armature coils, which must be kept in their original shipping containers until they are used.

An overhead crane is essential for quick handling of heavy motor parts. The plan as shown in Fig. 1 provides such a crane to span the center bay and travel its entire length. Machines handling the heavy work are located in this aisle, while those doing the light work are located in bay III, with the exception of the coil repair department, which occupies the end of bay I.

The shop is divided into nine sections, each being separated from the other by white lines on the floor. Two wide aisles at right angles are provided for electric truck traffic. One runs from the foreman's office through the center of the building to the exit on the opposite side, while the other runs the entire length of bay III. These

*Maintenance engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



Dynamometer Testing Set, with Control Board, for Load Testing. The frame permits easy alinement for motor shaft

arteries enable small shipments of stock to be brought in or removed from the shop quickly.

Since the receiving and shipping department is the beginning and finishing of any job, we have arranged the shop to receive and ship the work at the end of bay II. The outside doors permit a motor truck to enter. The part to be repaired is lifted by the crane off the truck and over the wall to a section reserved for this material. This wall serves as a shield, so that the doors can be opened without chilling the shop. The storeroom is connected to this truckroom also, and a monorail crane is provided to lift the electrical supplies from the truck, thereby saving the storekeeper the labor of handling them.

Testing Department

The testing department is conveniently located between the unloading department and the assembly floor, to eliminate excess handling of complete equipment. When a motor comes into the repair shop for repairs it is moved to the testing department, where the extent of the repairs is determined. From the test floor it goes to the assembly floor to be disassembled. On its outward journey it returns from the assembly floor for a final test before being shipped.

Equipment in the testing department includes the dynamometer and control board for load testing. The control board has four panels, one for starting and controlling d.c. motors; another for starting and controlling a.c. motors, both wound and squirrel-cage type; a third for controlling the load on the generator; and a fourth for power distribution. The control equipment on these panels is designed to handle the maximum output of the dynamometer.

The dynamometer set as shown was made by the Miller-Seldon Co., Detroit, for quick connecting and discon-

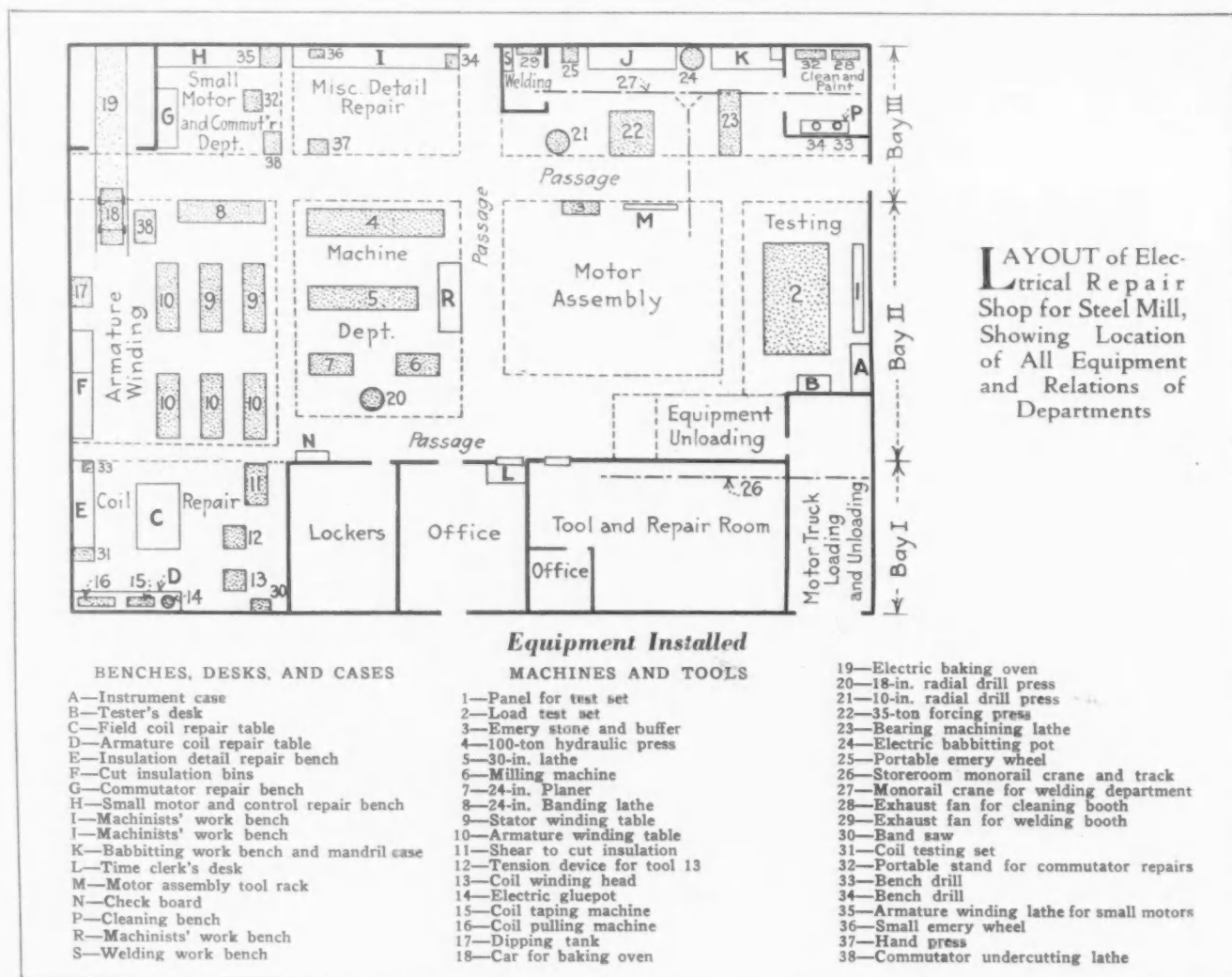
necting of motors to generator. The generator is of sufficient capacity to overload by 50 per cent the largest general-purpose motor in the plant, for a period of 15 minutes to obtain the best results.

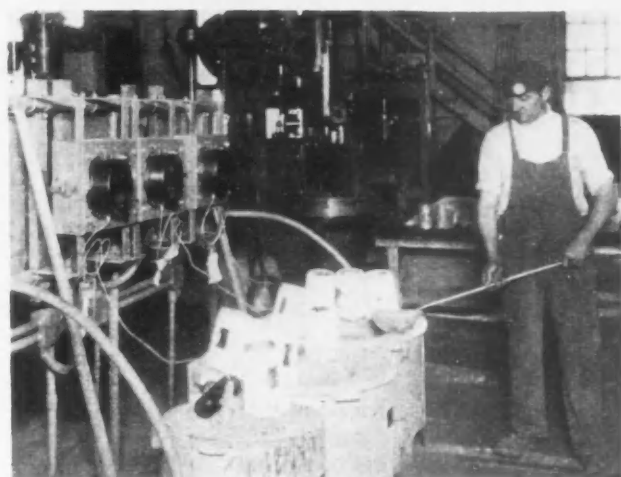
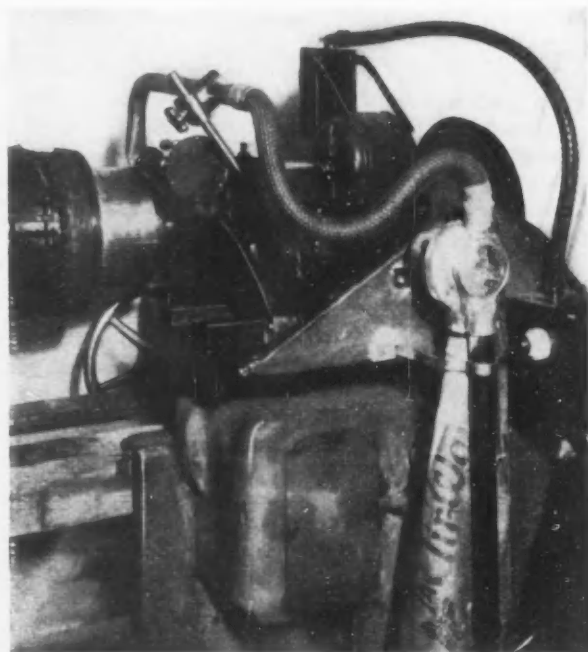
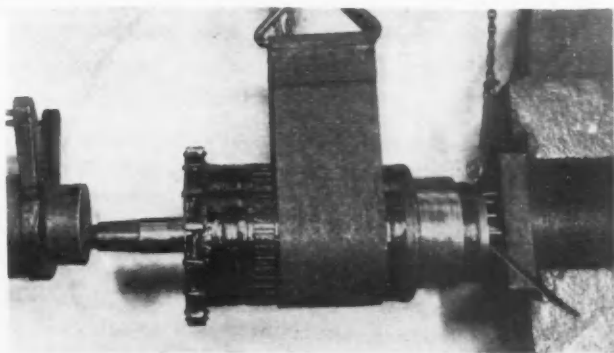
A welded fabricated steel frame mounts generator and motor. The platform on which the motor is to be mounted for quick alinement to the generator shaft is raised or lowered by four jackscrews, one at each corner. Each screw has a sprocket wheel, all driven by a common chain, for the raising and lowering operation. The outside corners of the platform should be supported by feet sliding up and down, as shown. When the correct height of the table is obtained, these feet should be permanently clamped so as to form a solid base for the motor, thereby eliminating vibration. The platform has two steel cross channels which can be spread to fit the various feet dimensions of any motor being tested.

A lathe chuck pressed on the generator shaft will receive several sizes of center pins, as needed to fit the various sizes of centers in different motor shafts. A dog placed over the motor shaft serves to drive the generator. This manner of connecting the motor eliminates a lot of sizes of couplings and makes it possible to operate the set efficiently without accurate alinement of the shaft.

Assembly Floor

After disassembling equipment to be repaired, the assembly floor distributes parts to the various departments where they will be repaired. Such repairs made, the parts are assembled and the equipment is turned over to the testing department for final test. This department should be fitted with a complete set of wrenches, each in its own place when not in use. In addition there should be a portable drill, air hammer, and pinion puller. This depart-





Armature Shafts Are Removed or Put in Place in a 100-Ton Hydraulic Press (Upper Left)

Undercutting Outfit in Armature Repair Department to Permit Undercutting and Polishing on the Machine (Above)

Babbitting Bearings, the Metal Being Melted in Electric Furnaces Under Close Regulation (Lower Left)

ment is the most convenient place for locating the emery wheel and buffer.

Miscellaneous Section

Cleaning booth, babbitting pot, bearing machining lathe and welding booth are in one section. The motor details are sent to this department from the assembly floor for cleaning. The cleaning booth has a pickling vat and a rinsing vat, both large enough to hold the largest motor frame.

Any mechanical part which does not have insulation attached is dipped first in a caustic soda bath, and then rinsed in a bath of water. Field coils and armatures are cleaned by the gasoline spray method. The booth has two sprays for painting and for gasoline cleaning. The latter has a valve which will pass a spray of gasoline and air, or just a spray of air to evaporate the gasoline after cleaning. All repairs are sent to this booth to be painted before leaving the shop. The painting spray may be taken to the apparatus and connected to an air line for painting. This room is ventilated by an exhaust fan.

The bearings after cleaning are re-babbitted in an electric babbitting pot. This can be mounted on a truck so it can be taken out for babbitting large bearings which cannot be conveniently brought to the shop. After babbitting, the bearings are machined to fit the armature shaft on which they are to be used. For this reason the department has a small lathe.

A 35-ton forcing press is provided for pressing a bearing into a housing. In this case the bearing is machined if necessary, after it has been pressed into the housing. To do this requires a large lathe which can swing the housing.

A portable welder for the welding booth sets under the work bench, thereby being out of the way. It can be taken easily to other parts of the plant, if necessary. This booth has also a portable gas torch. An exhaust fan removes

excess welding heat and thereby provides a comfortable working place for the welder. Outside the booth is a Martindale flexible-shaft emery wheel to smooth off the welds and rough spots. This grinder, on a portable stand, can be moved to other departments, wherever it can be used to advantage—especially the armature stripping benches, where it is used to clean out armature slots.

Machine Department

The machine department should have suitable tools to handle the necessary repairs, and make parts only in emergency. It is false economy to be equipped to machine from rough stock parts which can be purchased from the manufacturer of the original equipment.

It is desirable to have a 100-ton hydraulic press to remove and assemble armature shafts, tighten commutators, etc. A large machine lathe is sufficient for this section, as the bearing and armature winding departments have their own lathes. A planer and a milling machine are handy, but could be omitted. A large drill press is necessary.

Armature Repair Department

To rewind armatures and stators, the usual armature-winding horses and stator-winding tables are required. The banding lathe for this department should have a tension device for keeping the proper tension on the banding wire. A separate undercutting outfit is essential, so that the commutator can be undercut and polished on the machine. The dipping tank should have a hinged cover opened by a weight connected to it by a rope passing through a pulley. In case of fire this rope would burn in two and let the cover drop on the tank.

A swinging crane with chain hoist handles the parts to be dipped, and holds them above the tank for draining. After dipping they are put on a car and rolled into an

automatic temperature-controlled electric oven to be baked. Along the outer walls is a tier of bins to store cut insulating material for the convenience of the winding department.

Repair of field and magnet coils, and general repair and replacement of insulating details on various kinds of apparatus, occupies the coil-repair department. It has a shear to cut insulation, a band saw to cut commutator mica strips, bench drill, press, electric glue pot, field-coil testing outfit and a taping machine for general repair work. To provide for emergency it has also a winding head and coil puller, so that coils can be made.

Small Motor and Commutator Repairs

Commutators should always be tightened with a press after heating, so this section is located close to the hydraulic press and the baking oven. Since it is easier to assemble the commutator details with the armature vertical, a portable stand to hold the armature in upright position during repair is provided, thereby maintaining a quick method of moving it to the press and thence to the oven.

It does not pay to rewind small motor armatures if a man's time is taken up wholly to do this type of work. But it does pay to have a man do this work during spare time. Hence this department has a small motor armature-winding tool.

Miscellaneous Detail Repairs

Odds and ends of control and motor details are brought for repair and reclamation to the miscellaneous detail section. The best facilities here are several good vises, a bench drill for light work, small emery and buffing wheel and a hand press for removing and replacing worn bushings.

The economics of repairing and reconditioning of electrical parts is quite similar to that of repairing and reconditioning the mechanical parts of any other type of machines. It is essential that the various operations be carefully studied so that the organization will perform them with the least amount of effort and time. With this type of shop lay-out we feel that an economical repairing schedule can be properly maintained.

British Comment on Chromium Plating

Temperature a Factor in Successful Results—Porosity Often a Source of Trouble—Experience Important

CHROMIUM plating is recognized as having wide possibilities if a surface can be produced that is unstainable for an unlimited time. There has been some question as to the success of the coating in the United States and according to a British authority, W. E. Harvey of Harcourts, Ltd., reports as to its success have varied in England.

In some trades, especially in motor car work, it has been pronounced an unqualified success. Brass founders have had very indifferent results at times, says Mr. Harvey in *Ironmonger*, London, but in the manufacture of bathroom fittings chromium plating has become an indispensable finish, its wide adoption in that branch of the trade being pronounced remarkable. Theoretically, a coating of chromium, glass hard, of polished, silver-like appearance, applied under the same conditions, should remain a permanent untarnishable surface as long upon one brass article as upon another. In practice it does in most cases, but not in all; hence the doubt which has arisen as to whether it should be depended upon as a sound commercial proposition.

Effects of Temperature

Chromium is an exceedingly hard metal and is affected by variations in temperature in a different degree from the metals upon which it is deposited. Although the differences in contraction and expansion are very slight, the possible effects in some cases are obvious. It may be that an intermediate elastic medium is required. Sometimes under coats of copper, or nickel, or both, are found to be a satisfactory base for chromium deposit. In other cases there is no necessity for this. It depends upon the metal to be plated, the shape and thickness of the article and the use to which the article is to be put. A thick metal article may be a different proposition from a thin one, and so on. Every chromium plating job presents its own problem, and the expert realizes when he sees an article where trouble is likely to occur. Want of experience is responsible for many so-called "mysteries."

Porosity of Plated Product Cause of Trouble

Porosity of a plated surface is often responsible for trouble. As chromium plating is a high-class finish, it is

worth while using good quality metal in the manufacture of plated articles, and using dried molds, too, when the metal is in the form of castings. Apart from the trouble that may be caused by the exudation of acid from "blow holes" under the chromium deposit, there is the question of appearance. A pitted surface may not be conspicuous with a brass finish; but defects of this kind are necessarily accentuated by bright plating. The thickness of the deposit is important, and information and advice upon this point should be sought from platers.

A fairly thick deposit is essential in many cases, and it is not every plant that is capable of giving the required result. In preparing the surface of an article for chromium plating it should be remembered that, if it is well "dressed" and polished, the result will repay the extra care in workmanship involved. All these are points worth keeping in mind, and many disappointments will be obviated by doing so.

Unsatisfactory Work a Bogey

So much for the origin of much talk about chromium deposit being unsatisfactory. It would, indeed, be surprising if, in the case of a new process of this kind, every small plating plant could reach perfection straight away. Further, it would be astonishing if even the larger plants, where research work is carried out to discover the cause of defects, could be absolutely proof against every possible cause of trouble, seeing that there is nothing in human experience that has yet reached this ideal state.

Although chromium plating has so far been mainly considered in regard to its virtue as a "finish," this is far from being the end of its uses or even, perhaps, the most important, says Mr. Harvey. Its application to molds and tools has been so successful in increasing their wearing properties and in other respects that it is in regular use for these purposes. Here, again, the correct method of plating must be adopted or it is useless.

As a final word, it may be pointed out that there has been much misunderstanding regarding the cleaning of chromium. There is a great difference between cleaning and polishing. While the latter is unnecessary, the former is essential, and is easily done by rubbing over with a damp cloth and finishing with a dry one.

Institute Unalarmed by Stock Break

Calm Confidence in Sound Position of Business Characterizes
Both Public and Private Expressions at Hotel
Commodore Meeting

CONVENING in its thirty-sixth general meeting the day after one of the worst stock market crashes in history, the American Iron and Steel Institute was undisturbed by the alarm that had captured an excited Wall Street. Both public and private expressions by leaders of the iron and steel industry reflected calm confidence in the sound position of business and the reassuring outlook for coming months.

Mill Operations Still Good

The growing stability of the iron and steel trade and the absence of price inflation were stressed by President Charles M. Schwab in the opening address, Friday morning, Oct. 25, in the Grand Ball Room of Hotel Commodore. Extemporaneous remarks from the platform by James A. Farrell, president of the United States Steel Corporation, were also encouraging. Pessimism, he declared, is not justified so far as the steel business is concerned. Operations, at 75 to 80 per cent, are good. Demand is sustained except in one or two lines and in some directions is even better than six months ago, he declared. Shipbuilding and structural steel fabricating plants are unusually active, being booked four to six months ahead.

Enlightened Selling Urged

Both Mr. Farrell and Mr. Schwab stressed the need for an enlightened selling policy, now that trade has receded somewhat from its peak volume. "If the people of the steel industry cannot maintain their equilibrium, we won't have good business," asserted Mr. Farrell. "If we fail at this juncture and violate the golden rule as between men and as between companies, then we can blame ourselves for anything that happens that will make the situation any different from what it is at the present time."

The cost sheet was recommended by Mr. Schwab as a means of forestalling an unsound price structure and of discouraging attempts to produce at capacity regardless of demand. He emphasized the fact that the industry's favorable showing this year has not been due to higher prices, but rather has resulted from greater demand for steel, enlarged output and lower costs.

The price stability of the past year has benefited steel consumers, according to Mr. Schwab, because it has enabled them to operate on a non-speculative basis. Steel buying has been for current consumption, and no big inventories have been built up. Since prices are not inflated, he added, there is no reason why they should give ground because of the present slight let-up in demand.

Willis L. King, veteran vice-president of the Jones & Laughlin Steel Corporation, also made a few remarks from the platform, at the conclusion of Mr. Farrell's speech. Mr. Schwab introduced Mr. King as "the only American honorary vice-president this institute ever had."

The technical program ensued, and some of the papers read are abstracted in the current issue of THE IRON AGE.

The banquet, held in the Grand Ball Room Friday evening, was featured by addresses affirming the good will existing between the United States and Great Britain. Hon.

Winston Churchill, former British cabinet member, said that the rest of the world "is dependent almost entirely in the immediate future on the cooperation and development of the English-speaking countries." He committed himself to naval equality between Britain and America, saying: "We have pledged our hands and hearts that Britain and the United States shall be for all time equal upon the seas, albeit strong."

"We don't want all the good people in the world to disarm while the bad ones remain heavily equipped for war," he added. "You are the friends we would most like to see strongly armed."

Mr. Churchill paid tribute to President Schwab and to J. Leonard Replogle and Bernard M. Baruch, who were also at the speakers' table, for the services they rendered during the war. He recounted how in November, 1914, Mr. Schwab had agreed to build twenty submarines in nine months, when the shortest time in which submarines had been previously built was 19 months. When work on the vessels was stopped because of President Wilson's opposition to American manufacture of war equipment for either side in the war, the incomplete submarines were transferred to Canada, where 10 of them were put into commission within seven months after they were ordered.

John W. Davis, former American ambassador to the Court of St. James, and Democratic candidate for President in 1924, indorsed Mr. Churchill's pleas for amity.

"The note struck here tonight," he declared, "stirs my being more deeply than anything that can be said about foreign policy. We have no fixed conviction that runs so deep as our earnest desire to maintain friendship with our kinsmen across the sea."

American Enterprise Praised

An address was made by another distinguished British guest, Sir Frederick Mills, chairman of the Ebbw Vale Steel, Iron & Coal Co., Ltd., Ebbw Vale, Monmouth, England, and past president of the Iron and Steel Institute (British). He contrasted the unsolved difficulties under which the British iron and steel industry is laboring with the prosperity of American plants. He frankly stated that he had come to this country to find out how to make steel at a profit.

"It is no mean achievement to make more than half of the steel of the world," he asserted, "but it is more of an achievement to make it at a profit."

Sir Frederick commented on the readiness of American steel manufacturers to give him all the information he asked for, and recalled that more than 30 years ago he had heard Mr. Farrell tell the steel masters of Europe that it was to their self interest to cease quarreling and that they would gain the most by working together in the closest harmony on the basis of a "live and let live" policy.

Dr. Sperry Awarded Medal

All those who contributed technical papers in the day's program sat at the speakers' table and were introduced to the audience. Mr. Schwab announced that the institute's

medal for the best paper read at its meetings last year had been awarded to Dr. Elmer A. Sperry. As Dr. Sperry is enroute to Japan, the actual presentation of the medal will be deferred until his return, President Schwab added.

The subject of the winning paper was "Non-Destructive Detection of Hidden Flaws" (THE IRON AGE, page 1214, Nov. 15, 1928).

The attendance at the banquet was 1837.

President Schwab Says Prospects Were Never Brighter

IN my long association with the steel industry I have never known it to enjoy a greater stability or more promising outlook than it does today. We are approaching the close of the best year the industry has ever experienced. It is estimated that the steel production for 1929 will exceed 57,000,000 tons. This is 10 per cent greater than it was in 1928, the best previous year. This high production establishes an important landmark but is by no means the most important or most significant aspect of the year in steel.

Gain in Stability and Balance

Greater output is, of course, gratifying to every steel man. As I view the industry, however, its most fundamental progress has been made this year in the degree of stability and balance which is now the outstanding characteristic of our business.

This fundamentally sound condition is largely responsible for the uniform prosperity which has been shared by all branches and all companies in the industry. It is significant that the industry's favorable showing has not been due to higher prices; our improved earnings are due to three factors: greater demand for steel, enlarged output and lower costs. There has been some slight increase in prices, but on the whole prices have been largely stabilized and held on an even keel. Here certainly is concrete evidence that when the whole steel industry within itself practices sound business principles, the resulting benefits are shared by every element in it.

No Big Inventories

Steel consumers as well as producers have benefited from this stability because it has enabled them to operate their own business on a firm non-speculative basis. Throughout the year sound buying methods have prevailed. Steel has been purchased for current consumption. No big inventories have been built up. At the moment there is a slight let-up in demand but we are in this fortunate position: that because prices are stabilized and contain no element of inflation there is no reason to give ground on prices whatever slight but inevitable fluctuations may occur in demand. In other words, it would be unfortunate if we were to let such fluctuations disturb the healthy balance which has been established.

Stability is the order of the day in every industry. Moreover, it is quite as ethical and necessary for the steel industry to think in terms of stabilized profits as it is to strive for stability in other respects. It is high time we scrapped the idea that the steel business must be either a prince or a pauper. Everyone recognizes that the ability of the steel industry to meet the greater demand for its products at lower costs has been helpful all around. It has benefited our customers and it has enabled us to make a better return on our investment than heretofore. There is absolutely no reason why this favorable situation cannot be maintained year in and year out even in times when business may not be as good as it has been right along.

Stability More Essential with Lessened Demand

This stability is beneficial not only during periods of greater demand; it is even more so in periods of lessened demand. We have all seen how lower costs have favorably affected earnings when we have a high output. We also know that if this demand falls off our costs are bound to increase, no matter what we may do. More than ever

we need a stabilized price structure at such a time, for no industry can stand a double onslaught of high costs and lower prices and still make headway. So I repeat that it is fortunate that our present prices contain no element of inflation that will bear purging in the event of a lessened demand. In other words, let us continue to be profit-minded. Let us be mindful of our costs as well as volume in seeking to further stabilize the industry in every respect.

Since I have been your president I have given a great deal of thought to this problem. It seems to me that if we are to make our efforts permanently effective we must know and be able to evaluate the true economic facts of our business and have a complete understanding of their significance upon production and distribution. I am a firm believer that one of the best ways of assuring progress on an even keel is to let the cost sheet be our compass. The cost sheet will tell us whether productive capacity in any branch of the business is in excess of current requirements. It will reveal uneconomic and obsolete practices. It will forestall an unsound price structure. It will discourage the attempt to produce to capacity all the time, regardless of demand.

It is time to discard the idea that costs are not important in determining sales policies because the latter are fixed by competitive prices. The fact is that competitive prices frequently fail to yield a proper return because they do not give adequate consideration to costs.

Two Reasons for Increased Steel Consumption

If we analyze steel's accelerated consumption we find it is due to two outstanding reasons: First, the extension and replacement of steel in its traditional fields, such as building, automobiles, railroads, highways, bridges, pipe lines, etc., and, second, the growing demand for steel for new uses.

The replacement factor alone provides a huge annual backlog for our business. You would be astounded if we were to compile figures to show the amount of steel that is used recurrently every year for replacements and extensions. I dare say that this field alone accounts for an enormous part of present day production. For instance, just as the replacement factor in the automobile industry is increasing in importance as more automobiles are put into service, so it is with steel—the more steel that goes into service the greater becomes the demand for its replacement and recurrent use. Fortified with this constant demand and the new uses to which steel is being put for things that are new, the industry occupies indeed an impregnable position as a basic necessity to our national growth.

Machine Not Causing Unemployment

Of course, underlying all other considerations, it is upon the prosperous condition of our people generally that the future of steel and every other industry depends. Under present-day living standards where one want makes way for another, high and sustained purchasing power is essential. It is highly gratifying, therefore, that labor generally is enjoying good wages, a surplus of which is finding its way into saving accounts and other fields of sound investment.

Labor as a whole is quite fully employed today. The mechanization of industry has resulted not only in light-

ening the load of the worker and affording him more leisure, but this same development has created many new jobs. You will find that the percentage of the population gainfully employed is probably as great as it has been at any time in the last decade. Certainly this would not be true if the development of the machine were creating fewer instead of greater opportunities for gainful employment.

No Grounds for Pessimism, Says James A. Farrell

THERE is a good deal of pessimism around at the present time; it affects some people more than others. I cannot see where it affects the steel business at the present time. With the exception of one or two of our commodities we are just as busy as we were; the prospects are just as good as they were, and I think that we are going to have a continuance of the present business. I think business is good when we can operate our plants 75 or 80 per cent. With the capacity which existed a year ago, we would be running about 110 per cent now. But, of course, we kept up with the demand; we have gone on expanding to meet the necessities of the country, and these necessities are increasing all the time.

Some Lines Even Better Than Six Months Ago

There are some lines of business which are even better than they were six months ago. I do not believe that there is a fabricating shop in the country today that is not booked up for the next four or five months.

As Mr. Grace said yesterday in his report to his stockholders, the shipbuilding business has not been as good in 15 years as it is at the present time. The shipbuilding yards on the Atlantic Coast, and they are all large yards, have sufficient work at the present time for six months, and there has certainly appeared a demand for new vessels.

Cupidity Is Greatest Danger

I think that Mr. Schwab has laid down principles which were more or less known to us, but it is like a great many other rules and regulations, they are more observed in the

If the equilibrium between production and consumption is maintained, there is no reason, in my opinion, why our present prosperity should not continue indefinitely. Fundamentally there is every reason why the use of steel will increase. The per capita consumption is growing rapidly—steel finding its way into many new fields and, through its adaptability, economy and its elemental security, is supplying a service which no other metal can perform.

breach than otherwise. Now if the people in the steel industry cannot maintain their equilibrium, why we won't have a good business, because the cupidity of people is ever with us, and when somebody thinks he can take business that belongs to somebody else the natural result is that somebody else is going to take something that does not belong to him. That is the main trouble with our industry. You cannot sell seven tons of steel to a man that only wants to buy one, and if somebody sells that one there is no reason why the other six should go around and spoil the bargain or the sale.

No New Tricks in the Game

Now, this whole situation is in our hands, and I have not found anybody in the steel business that is any smarter than anybody else, and there are no new tricks in the game (laughter). Now, with the standard that has been laid down by Mr. Schwab, assuming that he speaks for his own company, which I know that he does, I will guarantee, as far as the United States Steel Corporation is concerned, that there will be no complaint about their ethics in business. You know this word "ethics" has become a very popular word, and "trade practices." I am not going to detain you any longer. There is a great deal of information which is more or less hermetically sealed inside of my anatomy, but I think I had better keep some of it there for the moment; but, if we fail at this juncture and violate the golden rule as between men and as between companies, then we can blame ourselves for anything that happens that will make the situation any different from what it is at the present time.

Steel's Growing Service to Civilization

BY E. F. KENNEY*

IT is estimated that the nation will consume more than half a ton of steel this year for every inhabitant. Without steel there would be practically no transportation by land, water or air. The generation of power, as we know it, or the application of power to perform useful work, would be impossible.

Non-ferrous metals have played a most important part in the development of civilization. But more than 21 times as much steel is produced in the United States as the combined consumption of copper, lead, zinc, aluminum and tin.

Railroads are pressing for stronger and safer rails and wheels to carry the heavier loads. For a number of years they have tried to meet the issue by increasing the weight of the rail and the carbon content. Today it is realized that the limit has been reached in carbon content, and that, unless the physical properties of steel are increased, the heavier and more massive rails will be no more resistant to wear than the lighter ones. Alloys have been tried, without much success. Heat treatment has been resorted

to, and appears to be more promising than any other remedy so far tried. But the future development of heat treatment depends on the economic necessity of greater wheel pressures and speeds to carry the increasing traffic.

Great Bridges of Steel

Spans of structural steel up to 500 ft., capable of carrying the heaviest loads, are not unusual. But the spanning of clear openings of extreme width has not been common in the past, and recent performances are striking. The largest completed to date is the Delaware River Bridge at Philadelphia. It has a clear span of 1750 ft., and carries six lines of automobile traffic, rapid transit and surface car tracks, as well as pedestrians. The entire load is supported by two cables, each made up of 18,666 steel wires having a total tensile strength of 59,000 tons. The work of constructing the cable, placing each of the 18,000 wires so that it will take its proportionate part of the load, and compacting the wires and protecting the cable, calls for the greatest skill and precision.

This bridge, great as it is, will be completely overshadowed by another bridge of similar character now being

*Metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

erected over the Hudson River at New York. Here the clear span is doubled to 3500 ft., or two-thirds of a mile, and four cables are used. These are similar to those in the Delaware River Bridge, but are larger, each having a total strength of 100,000 tons.

It is characteristic of the engineering strides being made in steel construction and significant of its future that within a period of five years the gap that we can span has doubled in breadth.

Buildings of Ever-Increasing Height

Spectacular development of large bridges is paralleled by the tall buildings in the congested metropolitan districts. The latest and greatest is the 80-story Empire State Building, to be erected on the site of the Waldorf-Astoria Hotel, New York. This building will be nearly 1000 ft. high and will house 50,000 persons.

Like a number of its neighbors, it is composed of a heavy steel framework carrying the masonry exterior which beautifies and protects the steel structure. It has been shown by the dismantling of Madison Square Garden and other older buildings that masonry covering is a complete protection against atmospheric corrosion of the steel frame. Experience, as far as available, indicates that such steel construction is the safest known for resisting wind, earthquake, fire or overloading.

Automotive Steels Demand Highest Qualities

Sometimes the demands for perfection in automobile steels seemed unreasonable. Trying to meet them was very hard; it was often discouraging, but it had its reward. Today the automobile is the greatest of all users of steel. In five years its requirements of steel have increased from 3,500,000 tons to 6,700,000 tons annually. There are more than 24,000,000 automobiles in general service in the United States; this year more than 5,000,000 will be built.

Because of the use of lighter materials in the construction of airplanes and airships, one does not immediately think of steel as a great necessity in their development. Yet the steel cylinders and other engine parts require the greatest perfection in the steel maker's art and without them the conquest of the air could never have been attained. A British seaplane recently averaged 355.8 miles an hour.

This required engines not only of tremendous power, but also of extremely light weight. To develop one horsepower for each 1½ lb. of engine weight means that every part is reduced to the lowest possible size, and that the steel composing these light high-speed rods and shafts must be not merely extremely strong, but must be perfect. Failure is fatal; no imperfection can be tolerated.

Enhanced Agricultural Productivity from Steel Uses

Seventy-five years ago two-thirds of the population lived in the country. Today only 43 per cent are rural dwellers. For purposes of comparison we may say that in the earlier period 10 farmers provided food for themselves and five city dwellers. Today 10 farmers provide for themselves and 13 city dwellers. The increase in productivity is due to steel. The power tractor, the multiple plow, and the many farm implements for tilling the soil and gathering the harvest, as well as the rail, water and automotive transportation utilized to conserve time and broaden markets, are possible because of steel.

In the petroleum industry, in the cracking processes by which the heavier oils are decomposed to produce gasoline, pressures up to 800 lb. with temperatures to 900 deg. Fahr. are not uncommon. One large company has inquired for an experimental oil refining plant to use a maximum pressure of 2200 lb. and a maximum temperature of 1500 deg. Fahr. The high pressures would not involve great difficulty, but the use of high temperatures, at which all of

the commonly used steels are materially softened and weakened, presents a staggering problem. As practically all of our manufacturing processes involve softening by heat to facilitate working, it is evident what difficulties are to be overcome if the material which is required must have the property of not softening on heating.

American Leadership Secure

Our own country produces now one-half of the world's steel supply. We have in our grasp a commercial leadership that must encourage us to the utmost effort to further the use of steel by careful manufacture and patient research. Steel today is far in the lead of other metals, both in adapting itself to the manifold new requirements of a changing world, and in the creation of new uses through research.

In the social, economic and political life of man, steel has made contributions without which the inhabited globe would be another, and far more primitive, place to live in. The service of steel to civilization is greater now than ever before. The pride of superior service and a spirit of scientific inquiry will carry steel to heights of usefulness of which as yet we can only dream.

What Steel Has Done for Humanity

MAN'S capacity to cooperate with others for the benefit of the human race, said Charles P. Perin of Perin & Marshall, New York, has shown its result in what steel has done for humanity. Steel is needed largely for transmission of energy and for vessels to transport food and other products. At the world's present rate of production of approximately 100,000,000 tons a year, the known reserves of iron ore will either have been completely depleted by the year 2000 or so highly impaired that we shall need a very great use of methods of beneficiation and a much more efficient use of the material itself. The present large proportion of scrap used in making steel is a great benefit in conserving ore.

Highly important for the future is the increasing use of rust-resisting products. Corrosion has been estimated to cause the discarding of from 19,000,000 to 31,000,000 tons of steel annually. However, the price at which alloy steel can profitably be sold must come down decidedly if enough of it is to come into use to cut down much waste from this source.

It might be mentioned in passing that the estimated reserves of ore in Cuba, amounting to 4,000,000,000 tons, account for some 80,000,000 tons of chromium and 40,000,000 tons of nickel, on the basis of 2 per cent of the former and 1 per cent of the latter. If these elements could be dissociated from their surroundings at a low enough price, this might point the way to much rust-resisting steel in the future.

Romantic Is the Story of Steel

Fairly romantic is the story of the increasing penetration of the universal metal into the life of our time, said Alvin I. Findley, editor *THE IRON AGE*, New York. Only a few years ago a per capita consumption of 500 lb. a year in the United States was pointed to as a mark to be aimed at; but only so confirmed an optimist as Mr. Schwab would predict its early realization.

Yet, difficult as we find it to account for the performance of this amazing year 1929, on the heels of the remarkable record of 1928, our use of steel this year will represent no less than half a ton for every man, woman and child. We are finding each year that the important outlets which we are able to check fairly well—automobiles, railroads and new construction—fall farther short of accounting for our increased production, and that much of it is due to the multitude of new forms in which steel is entering into everyday life.

The paper gives us a distinct impression of the steady

pushing up of the demands of modern engineering upon the steel maker and the more than adequate response of the industry. Illustrating how fast we are moving are two items made public since the paper was put in print. One is a contract made by a Detroit automobile company for record-size steam generating units that will use steam at 1350 lb. pressure, against the 1200 lb. mentioned. The other is the announcement of plans for a 100-story building in New York, coming while wonder was still new over the 80-story Empire State Building referred to.

The author has well summarized the situation in respect to steel rails. There may be dissent from his reference here to alloy steel, and the difference may be partly one of definition, seeing that the steel rail statistics of the institute do not classify as alloy steel the considerable rollings in recent years of rails carrying an extra content of manganese. Cost will be an important factor, but a further development of the alloy steel rail would seem likely if service demands continue to increase.

Highly interesting are the references to steel as a factor in airplane and airship construction. It may be added that chromium-molybdenum steel tubing is now standard construction for airplane fuselages and that, while most of the dirigibles have duralumin skeletons, the great British R-101 has stainless steel tubing in all main members.

Nothing in his paper is of more moment to the industry

today than Mr. Kenney's references to the part research must play in making a product that will meet all the new requirements of a fast changing world, and in creating new uses for steel. In the minds of our European competitors American steel making has long been synonymous with tonnage. Sometimes they have even hinted that we sought volume at the expense of quality.

If they have been alive to what has taken place, especially in the past four or five years, they have learned that research for the betterment of the product and the enlargement of its place in modern life has engaged our steel makers as never before. Steel that will resist corrosion, steel that will carry heavier loads with lighter section, steel that will withstand high temperatures, steel that will meet the present-day demand for speed of transportation by water, by land or by air—these are the main objectives of fourfold more investigators than were similarly engaged as the century opened.

The paper before us is entirely within bounds in its prophecy of the greater achievements of the industry in providing steel of better quality and wider variety of form. Not only may we look confidently to the steel of tomorrow to add vastly to the satisfactions of human life, but to aid largely in making it possible for the average man to maintain life on a high level by working but 40 hr. out of nature's weekly allowance of 168.

Fatigue of Metals—A Review

BY H. F. MOORE

IN the ten years which have elapsed since Professor Moore last addressed the Institute there has been one outstanding achievement of research on fatigue of metals: It has been definitely proved that metal actually has an endurance limit. About a dozen different steel test specimens have survived a billion reversals of stress without fracture; one is unbroken after 10 billion. Generally speaking, the more ductile metals must be operated to a very high number of cycles to determine precisely the endurance limit, and duralumin constitutes the only doubtful exception to the first statement (although work on this alloy is still in progress).

Professor Moore's paper contains illustrations of a wide variety of fatigue testing machines. (In passing it might be mentioned that he favors the term "failure from progressive fracture" to the term "failure from fatigue.") Some of them are designed to stress the specimen in direct tension and compression, in order to avoid the concentration of stresses existing in a rotating beam, but the uni-

formity of stress across a tension specimen is said to be illusive—differences of 10 per cent can be found by mounting extensometers at different places on a tension specimen mounted in the best of approved grips.

Short-time tests were also discussed. Experiments at loads which cause breakdown in a short time are of no value, for the ability to stand excessive punishment is related to the ductility of the metal, whereas the true endurance limit is a function of the ultimate strength or the hardness, as shown by the curve. Other than inferring the value from a tensile test, the only rapid method of promise was described in *THE IRON AGE*, June 6, page 1572, and depends upon finding the first microscopic flaw to open up, under gradually increasing loads, by measuring the electrical conductivity of the specimen. Professor Moore has tested this method, using four steels and four non-ferrous alloys, and finds it to give results which closely approximate those of more tedious methods.

Theory of Fatigue Still Doubtful

A comprehensive theory for the phenomena of failure from progressive fracture is not yet formulated. It must harmonize such curious facts as (a) understressing increases the endurance limit, even as much as 30 per cent, but this figure varies for different materials; (b) overstressing decreases the endurance limit; (c) the surface condition, such as polish, has a great effect on the result; (d) a Vee notch with bottom radius of 0.005 in. reduces the endurance by two-thirds; (e) running the sample in fresh water reduces the endurance limit as much as 50 per cent, and removes whatever advantage heat treatment may give to a specimen when run dry; (f) while the endurance limit of most metals is below their elastic limit, this is not true for annealed iron or copper.

It is believed, however, that a failure from progressive fracture cannot occur unless the stress on the entire piece is sufficient to start the fracture at some point where stresses are concentrated by a flaw existing in the metal, or induced by corrosion on the surface. Homogeneity is therefore to be striven for in the production of metal for

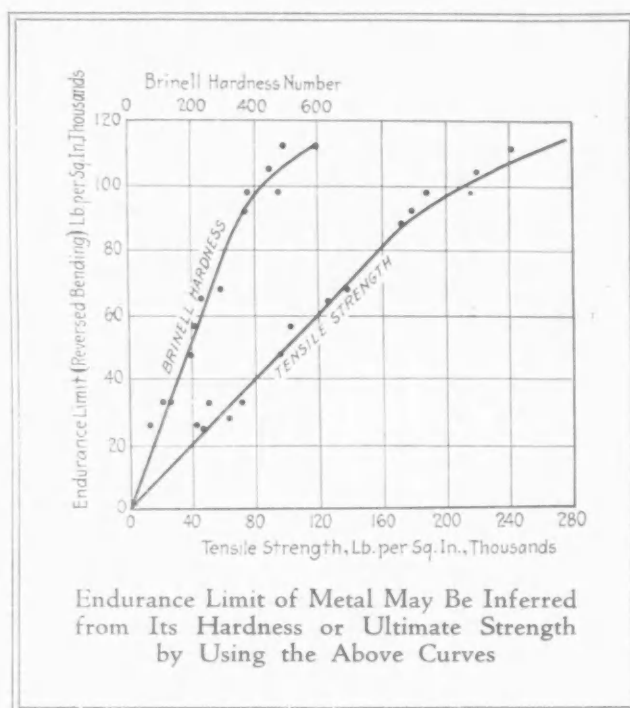
GRADUATED from New Hampshire College in 1898, H. F. Moore received his degree of doctor of science in 1922. He was instructor in machine design at Cornell University, 1900 to 1903. From 1904 to 1907 he was assistant professor of mechanics, University of Wisconsin. He has been professor of engineering materials at the University of Illinois since 1907. He is author of "The Materials of Engineering." He has served the American Society for Testing Materials as president.



high endurance. Furthermore, there is no special alloy steel which has unusual virtue, except as it may be successfully and uniformly heat treated in a commercial way to a high ultimate strength, because laboratory treated carbon steels give just as high endurance limits as the best alloys.

Some tests made at elevated temperature suggest to Professor Moore that, at temperatures of 1000 deg. Fahr. or above, the endurance limit will probably be above the limiting stress from creep or plastic deformation.

In conclusion, the speaker gave it as his opinion that three-quarters of the fatigue failures in service were due



to faulty design or surface corrosion, rather than to poor materials.

Practical Use of Endurance Data

In discussing the paper, J. A. Capp, engineer Testing Laboratory, General Electric Co., Schenectady, N. Y., described some efforts he had made to interpret the static and endurance tests of metal to designers in his organization. He emphasized that engineering formulæ are based on the supposition of homogeneous materials acting within the elastic limit, whereas steel and in fact all metallic alloys are random crystalline aggregates shot full of non-metallic inclusions and probably sub-microscopic voids. Nevertheless the static or slow-moving tests, as of tension, torsion or hardness, give statistical results, integrating all the irregularities of stress distribution and elastic movement within the specimen. The fundamental difference of the alternating endurance test is that it searches out the weakest spot—this spot is what initiates the crack which ultimately spreads across sounder metal to complete fracture. It is a microscopic test of the finest details of structure, rather than an averaging of the strong with the weak.

F. N. Speller, director department of metallurgy and research, National Tube Co., Pittsburgh, pointed out the similarity of the harmful effect on the endurance limit of tiny notches and of surface corrosion; the latter is due to non-uniformity and the familiar pitting action merely produces damaging notches. Unfortunately, alternating stress apparently increases the corrosion rate greatly at these random centers. Experiments in his laboratory indicate that the bad effects of tap water corrosion may be entirely counteracted by greasing the specimen or by a

small percentage of an inhibitor, such as sodium chromate, dissolved in the water; but this is effective only as long as the inhibitor is used. It has also been found that the rate at which the stresses alternate has a great effect upon the damage done by corrosion fatigue. Thus, a corroding specimen, run slowly, may actually have a long life in hours.

Short time tests were also discussed by Dr. H. W. Gillette, director Batelle Memorial Institute, Columbus, Ohio. He observed that time could be saved by speeding up the reversals to the condition where the specimen is a vibrating reed. Jenkin, in England, has in this manner achieved as many as 10,000,000 reversals of stress in 15 min.; his results (which may be in error as to the maximum stress) do not check those found by the relatively slow rotating beams. Similar work on very high frequency alternations at the United States Bureau of Standards do not seem to agree with Jenkin's work, and the whole question requires further study. Other investigations must also be made on large specimens—like a full-sized axle—and on refrigerated metal, at temperatures met in severe winters or by flyers at high altitudes.

Detecting Sulphide Areas in the Presence of Phosphides

THE original method of Heyn and Bauer for detecting sulphides and phosphides depends on the difference in color of the sulphide and phosphide of mercury. When a polished section is etched with an acid solution of mercuric chloride, the sulphide areas appear black, while the phosphides are colored a lemon-yellow.

However, according to M. Niessner, in *Stahl und Eisen*, the sulphide reaction, in the presence of a large quantity of mercury salts, and a deficiency of hydrogen sulphide, yields the so-called sulpho-salts, which are white to yellow in color. In order to prevent erroneous interpretation of the etching figures, therefore, some further test was necessary, and has been developed.

It was found that a solution containing iodine and sodium azide reacts with sulphides, evolving nitrogen gas. In making the test, gelatin paper is first soaked with the acid mercuric chloride and placed upon the sample. After four to five minutes it is removed and dried. Dark areas represent sulphides. Yellow areas are tested by dropping upon them a little of the azide solution. In the case of sulphides a visible evolution of gas takes place. Absence of gas indicates a phosphide area.

The azide solution is approximately one-tenth normal in iodine and one-fifth normal in sodium azide (NaN_3).

The behavior of binary alloys is affected by the presence of relatively very small quantities of impurities. In more than one instance it has been found that less than 0.1 per cent is sufficient to produce serious modifications in the apparent equilibrium diagrams obtained. A striking example occurs in the case of the alloys of aluminum and zinc. Certain of these alloys containing about 78 per cent of zinc, after quenching at a suitable temperature, undergo a spontaneous hardening, followed by spontaneous softening accompanied by the evolution of a considerable amount of heat. In the course of the investigations of Hanson and Gayler in England, zinc and aluminum of the highest available purity were utilized, and the phenomena in question made themselves very strongly evident. If, however, alloys of this type are made up of commercial zinc with a small content of lead, the whole of these phenomena are either suppressed or rendered very feeble. In the same way, it has recently been discovered that small amounts of impurity in iron materially affect the position of the critical transformation temperatures, and it has even been suggested that in entirely pure iron the so-called allotropic transformations would not occur at all.

Gear Makers Meet in Philadelphia

Discussions Include Market Analysis, High-Strength Cast Iron, Tungsten Carbide Tools and Technical Standards

IMPORTANT problems bearing directly on gear manufacture and marketing were discussed at the semi-annual meeting of the American Gear Manufacturers Association, held at the Benjamin Franklin Hotel, Philadelphia, Oct. 24, 25 and 26.

High-strength cast iron, tungsten carbide cutting tools, and a recently started investigation of worm gear drives were among the topics featured. There were also addresses dealing with a method of analyzing the market for gears, and the rôle of the trade association in industrial standardization.

Progress reports were submitted by 12 sub-committees of the association's general standardization committee, which is headed by B. F. Waterman, engineer, Brown & Sharpe Mfg. Co. One recommended practice, for herringbone gears, was accepted. Renewed activity in the association's commercial standardization work is indicated by the appointment of a new committee with F. W. Sinram, president, Gears & Forgings, Inc., Cleveland, chairman. A. F. Cooke, vice-president, Gears & Forgings, Inc., and president of the association, presided at all sessions.

Two companies were elected to membership. They were the Massachusetts Gear & Tool Co., Woburn, Mass., with E. R. Lyman, president, as executive representative, and the Atlantic Gear Works, Brooklyn, N. Y., George Scherr, executive representative.

Members and guests of the association were luncheon guests of the Philadelphia Gear Works, Oct. 25, at the Benjamin Franklin Hotel. The Hon. Harry A. Mackey, mayor of Philadelphia, was the principal speaker, and was introduced by G. L. Markland, Jr., chairman of the board of the Philadelphia Gear Works.

Hugo Bilgram, president of the Bilgram Machine Works, Philadelphia, widely known for his contributions to the art of gear cutting, was a speaker at the opening session. His outline of the invention of his bevel gear shaper in 1874 and 1875 and of other mechanical inventions was received with interest.

The spring meeting of the association will be held next May in Cincinnati, the dates to be announced later.

Gear Standardization Makes Progress

A RECOMMENDED design practice for herringbone gears, submitted by A. A. Ross, engineer metal gear department General Electric Co., West Lynn, Mass., and chairman of the herringbone gear committee, was accepted. This practice sets maximum and minimum values for such factors as pressure angle, helix angle, etc., instead of offering at present a definite single standard for all factors.

The metallurgical committee, the chairman of which is C. B. Hamilton, Jr., president of the Hamilton Gear & Machine Co., Toronto, Canada, has been working with sub-committee No. 8 of the sectional committee on the comments received since the broadcasting of proofs of the recommended practice for forged and rolled alloy steel for gears.

Use of a non-resonant railway gear is to be suggested at the next meeting by the electric railway, mill and mine gears and pinions committee, which is headed by L. F. Burnham, manager of engineering Nuttall works

of the Westinghouse Electric & Mfg. Co. "The non-resonant gear," it was explained, "is one which has its high-pitched operating notes, due to vibrations caused by tooth interference and impact, deadened by the use of an attached body in intimate contact with the gear itself."

The worm gear committee, with W. H. Himes, mechanical engineer Westinghouse Electric & Mfg. Co., chairman, presented for discussion some 15 changes in the worm gear nomenclature submitted to the association at its meeting last Spring. This part of the committee's work is now before the A. G. M. A. nomenclature committee. A series of tests which may later develop into a recommended practice is contemplated by the worm gear committee.

The work of the bevel and spiral bevel gear committee, headed by F. E. McMullen, Gleason Works, Rochester, N. Y., is at a halting point pending review of its report on nomenclature by the association's nomenclature

committee. It is planned to work up data on loads for bevel gears.

The nomenclature committee plans to submit at the next meeting four different nomenclature reports which will include definitions, sketches, etc. The columns in the nomenclature designated as "symbols" will be changed to "abbreviations." D. T. Hamilton, Fellows Gear Shaper Co., is chairman of the committee.

Progress was reported by the spur gear committee in its work on horsepower tables. The tables so far worked out are to be reduced in size. J. L. Williamson, Fellows Gear Shaper Co., Springfield, Vt., is chairman of this committee.

H. R. Moyer, Westinghouse Electric & Mfg. Co., has been appointed chairman of the non-metallic-gearing committee to succeed T. C. Roantree of the Westinghouse company, who is engaged in other work.

A number of changes in the roller chain and sprocket recommended practice adopted by the association in 1925 are contemplated by the A. G. M. A. sprocket committee and other cooperating committees of the A. S. A. G. M. Bartlett, consulting engineer, Diamond Chain & Mfg. Co., Indianapolis, is chairman of the A. G. M. A. committee.

A new series of chains with pitches from $\frac{3}{4}$ to 3 in. are recognized; these have the same proportions as the standard series but have thicker side plates and are to be known as the extra-heavy series. The formula for minimum breaking strength included in the recommended practice is abolished. A light weight machinery chain, to be designated as the No. 41, is recognized as standard. Its pitch is $\frac{1}{2}$ in., width $\frac{1}{4}$ in. and roller diameter 0.306 in. Limiting tolerances, maximum and minimum, for chain parts, within which it is necessary to keep in order to assure interchangeability between connecting links as produced by different makers of chain are included in the committee's recommendations. Supplementary information includes recommended chain working loads, maximum sprocket speeds, and metal pattern teeth for cast sprockets.

H. J. Eberhardt, secretary Newark Gear Cutting Machine Co., Newark, N. J., in reporting for the tooth form committee, read a communication from Prof. U. Holland of the University of Pennsylvania, asking for information relating to the tooth

form standards promulgated by the A. G. M. A. The committee's reply to this letter contains an interesting elaboration of some of the details of these standards, and will be included in a later issue of THE IRON AGE.

C. B. LePage, assistant secretary of the American Society of Mechanical Engineers, outlined the status of the work of the 10 sub-committees of the sectional committee on the standardization of gears.

Role of the Trade Association in Standardization

AS heretofore at the fall meetings an evening was set aside for a technical standards meeting, at which the 12 or more technical sub-committees get together to formulate plans for the winter months. Immediately preceding these group meetings, Dr. P. G. Agnew, secretary of the American Standards Association, New York, addressed the association on "The Role of the Trade Association in Industrial Standardization."

A large number of trade associations make standardization one of their principal activities, and at present more than 200 trade associations are officially cooperating in the work of the A. S. A., said Dr. Agnew.

The organized standardization movement, so far as it has been developed, largely begins and ends (in the use of standards) in the individual company. "Company executives should be alive to the economic importance of the movement and in sympathy with it. Instead of leaving their standardization work as a more or less incidental and somewhat unconscious function of the engineering and production departments, industrial executives are more and more providing a definite organization through which the standardization activities of the company are carried out," he said. "While steady progress is being made, we are still far behind Germany in the matter. There, more than 1000 firms have a special organization for carrying on this work; in all of the great companies the standards department reports directly to the general management."

In discussing the function of the trade association in the standardization movement, Dr. Agnew pointed out that one of the educational functions of the association should be to bring home to the executives of its member companies the economic importance of standardization and its significance as a management tool.

The attempt to control a standardization project entirely within the association, when other groups have an important stake in the project, was said to be an error frequently made, especially by the less experienced associations. "The number of standardization undertakings sufficiently narrow in scope to be properly handled without the cooperation of other groups is very much smaller than is generally realized," he said. "Too often there is also the attempt to leave competent consuming groups entirely out of the picture."

It was emphasized that the trade association should require responsible representation on the part of its members on committees dealing with standards. The meaning of representation and of the responsibilities it entails is not always understood, said Dr. Agnew. "In committee work the A. S. A. has so frequently found it necessary to call the importance of this matter to the attention of co-operating bodies and their representatives that it has formulated the following for use in such cases: It is the duty of a representative 'to keep sufficiently in touch with his organization so that he can correctly interpret its attitude in the development of the work and in participating in decisions in the sectional committee; to keep his organization informed of

developments; to act as a leader in the formulation of the policies of the organization in regard to the matters with which he is dealing; and to refer back to his organization questions upon which he feels unauthorized to speak for it.'"

Another essential function of the association in the standardization movement was said to be the systematic promotion of the use both of its own standards and of those national standards in whose formation it has taken part. "One of the easiest ways of accomplishing this is by stimulating systematic references to such standards in catalogs, in advertisements, etc. Surveys by the association of the extent of the use of its standards is a most effective means to this end," said Dr. Agnew.

New Commercial Standards Committee

PROJECTS to be undertaken by the new commercial standardization committee include revision of some of the items of the proposal form that was recommended as standard practice by the association some years ago. It is also planned to gather periodical trade statistics, including orders and billings, that will serve as an index to aggregate business conditions in the industry. In addition to F. W. Sinram, chairman, members of the committee are: S. L. Nicholson, assistant to the vice-president of the Westinghouse Electric & Mfg. Co., New York; A. R. Ford, president Frost Gear & Forge Co., Jackson, Mich.; Howard Dingle, president Cleveland Worm & Gear Co., Cleveland; and R. C. Ball, president Philadelphia Gear Works.

In an address on the "Market for Gears," W. E. Kennedy, sales manager, *American Machinist*, New York, effectively illustrated a method of market analysis and planned selling as applied to the gear industry. In all lines, the market for gears is expanding, due to the increase in machinery production, he said.

The intensive cultivation of local or neighborhood markets, because of the advantage of shipping rates, closer contact with buyers and their needs, was stressed. Small or single gear orders were in many cases taken at a loss, he said. The percentage of such orders is frequently much larger than realized, and proper analysis of sales would lead to greater effort in obtaining the more profitable type of business.

Investigating Worm Gear Drives

THE equipment and methods of a recently begun investigation of worm gear drives were outlined in a paper by Emil Dukes, Gears & Forgings, Inc., Cleveland, on "Load and Speed Conditions of Worm Gear Drives." The object of the tests, which are being conducted at the Case School of Applied Science, Cleveland, is to determine a reliable method of calculating worm gearing.

"The method used at present is rather vague," said Mr. Dukes. "The load per sq. in. of projected area of one tooth is calculated, and this multiplied by the pitch velocity of the worm gives a factor called pv . The value of this factor determines whether a certain worm and gear combination is adapted for the work in question. It is left to the experience and judgment of the designing engineer what value of pv will be acceptable in each case.

"This method obviously is not scientific and does not correspond to the actual facts. The value of p , the pressure per sq. in. of projected area, while proportional in a degree to the actual bearing area, which is a secondary curve resembling the ellipse,

does not take into consideration the number of teeth in contact. The larger the number of teeth in contact for the same pitch, the larger the bearing area produced by the elastic deformation of the materials under load.

"All calculations will be based on this actual bearing area. Instead of p being the tooth load divided by the area, it will be figured as the maximum specific pressure existing between two cylinders in contact under pressure. For this purpose we will use the Hertz equation.

"The factor v also is used without discrimination. The permissible pv which we hope to arrive at will take into consideration whether the worm has a single thread or multiple threads."

The test apparatus includes a 30-hp. Sprague dynamometer, which is coupled to the worm shaft by a Franke coupling, and a Prony brake. A platform scale is used for measuring the Prony brake load, and a revolution counter for getting the speed. Temperature measurements were made by iron-constantan standardized wire thermocouples, with a Leeds

& Northrup potentiometer. Four couples were used, at the worm, the case, the thrust bearing carried and the oil sump.

It is expected that the tests will require a period from 6 to 12 months; results will be given in papers at subsequent meetings.

Tungsten-Carbide Tools Most Remunerative on Production Jobs

"IT may now be said without fear of successful contradiction that cemented tungsten-carbide tools are here to stay and that they will fill an even more important place in our industrial life than was evident a year ago" said Dr. Samuel W. Hoyt research laboratories, General Electric Co., Schenectady, in an address on "Tungsten Carbide Tools" at the second general session, Oct. 24, of the gear association meeting.

"In many instances it has been the spectacular performances which have attracted attention," he said. "They merit all the attention they have received, but it has already become clear that the new tools find their most remunerative work on the much more prosaic 'production' jobs. It is by doing the large scale production jobs that these tools have won their place. They have demonstrated their ability to take their place 'in the line' on a truly commercial basis, and the results, measured in terms of increased production and reduced costs, and in terms of thousands of tools and hundreds of thousands of parts produced, speak more eloquently than words for the place cemented tungsten carbide has already attained."

Effects of Cobalt Content

In describing the nature of cemented tungsten carbide and its manufacture, Dr. Hoyt said, in part: "While the function of the cobalt is to cement the particles of tungsten carbide together, it is also true that the amount of cobalt used affects the hardness and strength of the mixture. Thus greatest hardness and least strength are obtained with low cobalt, or of the order of 5 per cent, while much greater strength and toughness and somewhat lower hardness are secured with higher cobalt, or of the order of 15 per cent. Cobalt contents of 20 per cent and above have been found to be too soft, or to wear too rapidly, for use as a cutting tool."

The various methods of "tipping" tungsten carbide to the steel shank of the tool were outlined. The most common method is by copper brazing.

"For this method the shank is first milled out to receive the tip, and here a fairly good fit is desirable, for the better the fit, the better and stronger the joint," said Dr. Hoyt. "The brazing is done in an electric furnace in an atmosphere of hydrogen, according to the usual technique. Later it was found that the carbide tip may be fastened on by welding the tip and shank around the contact between the two. The shank is first beveled at the margin and the space left filled in with a welding rod and the atomic hydrogen flame. This is

particularly well adapted for use in a shop. Tools have also been made by uniting the tip and shank by the special cements made for uniting high speed steel tips to a steel shank.

"It has been found that tungsten carbide tips which are rigidly welded to the shank are only too apt to come off, either directly after the tool is made, or after being put in service. This is due to thermal stresses which are set up by temperature changes and differences in the coefficients of expansion of the carbide and the steel. This circumstance accounts for the popularity of copper brazing, because here the thin layer of copper affords a soft cushion which absorbs such stresses without transmitting them to the carbide tip. On the other hand, copper softens at elevated temperatures, so that it is necessary, in the design of the tool, to remove the joint far enough away from the cutting edge so that it does not get dangerously hot during operation. The 'welded' tool loses less strength at high temperatures and hence can be made smaller for a given job."

It was pointed out that at the start of the work on tungsten carbide tools, the grinding of the tools presented new and unique problems, which, however, have been solved. Silicon carbide wheels are used, coarse grinding being done on a wheel of grade 60, while for fine grinding wheels of grade 100 to 120 or even 200 are employed. The pressure on the wheel should be light and grinding should be away from the cutting edge to avoid chipping. For tools used for fine finishing work, the edge is frequently lapped with boron carbide or diamond dust. It was stated that by this means the tool can be given a very good edge and, if necessary, can be brought to size within a tenth of a mil. The lapped edge is found to have considerably longer life on such operations than the edge produced by grinding.

Cutting Angles Differ from Those of Steel Tools

In regard to the clearance angles of the tool and the shape of the cutting contour, it was pointed out that those best suited to tungsten-carbide tools differ from those which are used with high-speed steel. "With this tool design the cutting edge is given the maximum support commensurate with the cutting requirements of the material being machined, while the stresses imposed by the chip are properly taken up by and transmitted to the shank," said Dr. Hoyt. "Both Friedrich Krupp and the Carboloy Co. adhere to these general principles although they differ in some details. In all cases the specific application

should be considered on account of the variation of these factors from case to case.

"In general, we may say that the top side rake of a simple turning tool for steel is made 12 to 14 deg., or 4 to 6 deg. less than is common with high-speed steel. The front and side clearance angles are made from 3 to 6 deg. If the tool is always set at center, or below, the smaller angle can be used to get the greater support. Perhaps the most unusual feature is the 0 deg. or even negative back rake which is so common. Another feature is the radius that is ground on the upper surface which curls the chip and increases the life of the tool. The body angle of the cutting edge is increased as the strength of the steel being machined increases.

"The cutting angles for cast iron are not greatly different from those used for steel, for general purposes. In this way advantage is taken of the keener cutting edge, a factor which will become more and more important as the speed of machining is increased.

"Non-ferrous metals require, again, different angles. Here it is customary to grind the tool with more of a "hook" by increasing the side rake and by adding a back rake which may be as great as 14 deg. Within the limits of this discussion, the same may be said of the non-metallics like Bakelite, hard rubber, etc."

High Cutting Efficiency May Be Utilized in Three Ways

To illustrate the significance of this new tool material when properly applied, some of the accomplishments in the field of machining metals were cited.

"The outstanding characteristic of cemented tungsten carbide is its high cutting efficiency," said Dr. Hoyt. "This cutting efficiency can be utilized in machine shop practice in three ways, to secure greater tool life with about the same speeds, feeds, etc.; to secure higher cutting speeds; or to machine materials which have been classed as non-machinable. A good example of what can be accomplished along the first line is furnished by automatic screw machine work. Here the feeds are light and the speeds high, while the time involved in setting up the various tools to get the accuracy required in this work becomes an important factor in the cost of doing the operation."

Use of the tungsten carbide tools for general turning work in the general automatic machine department of the General Electric Co., Schenectady, was cited. Automatic machines of every make and size are used to produce parts which vary greatly in material, size, shape and accuracy, and the department is being equipped entirely with Carboloy tools.

A notable achievement cited to illustrate how the tool material is able to make an otherwise non-machinable material available to industry was the machining of the

"Lo-Ex" aluminum alloy used for pistons by the Reo Motor Car Co. "This piston alloy was developed several years ago, and was known to possess valuable properties for this service, one in particular being its low coefficient of expansion," said Dr. Hoyt. "The high-silicon content rendered this alloy 'non-machinable' with the tool materials available at the time. With the advent of the cemented tungsten carbide tools it became possible to machine these pistons commercially."

Machine Tools Designed for New Tools

In discussing the effect of tungsten carbide on machine tool construction, reference was made to demonstrations of "carbide" lathes at the recent expositions held under the auspices of the American Society for Steel Treat-

ing and the National Machine Tool Builders Association. On these machines, designed especially to take advantage of the cutting efficiency of the new tool materials, cast iron was machined at a speed of 1200 ft. per min. and steel at 600 ft. per min., with a power consumption which exceeded 30 hp. This, it was pointed out, was a development since the introduction of tungsten carbide a little over a year ago. "The performance is of an entirely new order of magnitude," said Dr. Hoyt. "The speed and feed were such that the tool post runs from 40 in. per min. as compared to 20 in. or less per min. for high-speed steel. This should be sufficient answer, but it is capped by the situation that these new lathes are geared so high that high-speed steel tools will not work on them."

Improvements Adapt Gray Iron for Wider Use

IN an address on "Gray Iron—a New Material," E. J. Lowry, consulting metallurgist, Detroit, outlined at the opening session of the gear association meeting the possibilities of gray iron in its present status as a material for gears and other machine parts.

The loss of a great deal of the popularity of cast iron as a material of construction was attributed to the fact that the developments in connection with the improvements of the material had not been given sufficient publicity. "During the last ten years the consumption of malleable castings has increased 100 per cent and that of steel castings 200 per cent, whereas the consumption of gray iron has increased barely 10 per cent," said Mr. Lowry. "Improvements in the quality of cast iron have been commensurate with those in the other two materials, but whereas the malleable iron and cast steel industries have promoted the sale of their product by educational advertising, the gray iron industry has been comparatively inactive and depended wholly upon individuals and technical societies to enlighten the interested public regarding the progress made in the production of this material."

"During recent years, careful technical control together with mechanical improvements has largely eliminated the causes for the unreliability of gray iron. The patternmaker no longer uses a constant shrinkage factor, but varies the factor and thus eliminates certain strains. The foundryman has improved his melting conditions and obtains surfaces with better finish by sand control and better molding practice."

Many Types of Cast Iron

From the standpoint of the iron founder it is unfortunate that the nomenclature of the industry has not changed with the improvement of the product. In the mind of the average engineer cast iron is still cast iron. As a matter of fact, there are just as many types of cast iron as there are types of steel. Purchasers have gen-

erally bought on a price basis, and nine times out of ten they receive exactly what they pay for. Within the last few years some consumers have attempted to improve their product by specifying the analysis and the Brinell hardness when issuing purchase orders. While this improves the reliability of castings, the industry should go further and grade cast irons in the same way as steels are graded according to S. A. E. specifications.

"The need for such specifications is well illustrated by the example of semi-steel. This material is made with from 1 to 50 per cent of steel, but all mixtures are covered by the same term. The steel content might well be added to the hardness and strength figures."

"At the present time many foundries operate on a basis of strength control and produce cast irons having between 30,000 and 60,000 lb. per sq. in. tensile strength. In comparison with these results the textbook figure of 20,000 lb. maximum looks ridiculous."

Mr. Lowry referred to the special cast irons which have been developed in Germany and England, as well as to those developed in this country by the International Nickel Co. and Ross-Meehan company. One foundry which uses the process of the International Nickel Co. consistently obtained over 60,000 lb. in more than 100 heats. For tensile strengths of the order of 50,000 lb. per sq. in. it does not seem necessary to resort to the use of special processes, as these can be obtained by the addition of one or more alloying elements, such as nickel, chromium, molybdenum and vanadium. Each of these alloying elements has certain definite effects, and by combining them in suitable proportions, almost any desired results may be obtained.

Cast Iron for Gears

"In the gear industry cast iron has been losing ground, particularly in the automotive branch," said Mr. Lowry. "Engine flywheels for in-

stance, formerly had the starter teeth cut in them directly, while now these teeth are cut in a steel ring which is shrunk onto the cast iron flywheel. The change was made mainly because of the porosity and the unreliability of the metal. Price played a big part. If the need for quality material had been impressed upon the consumer the troubles could have been avoided."

"In the machine tool industry cast iron gears have been replaced largely with bronze and steel gears. Bronze was chosen largely because of its greater resistance to impact. In some cases, however, alloy cast irons have regained this field for the iron founder."

"With an increase in tensile strength of cast irons their impact value also increases, sometimes in direct proportion and sometimes much faster. In one particular case an increase of 30 per cent in tensile strength was accompanied by an increase of 400 per cent in impact value. This combination of high tensile strength with high impact value is essential in industrial gearing because of the shocks to the gears when starting machinery."

In reference to the attempts to replace cast iron in machinery frames by welded steel sections, Mr. Lowry said that considering the finished product, the material cost is less in the case of cast iron than in that of welded materials or other than gray iron castings. With increase in strength, sections may be lightened and the safety factor be reduced in many instances.

To successfully use cast iron it must be bought on the basis of quality rather than of price; proper specifications must be applied to it, and a definite classification of cast irons must be formulated and adhered to.

Prizes for Developments in Gas Cutting

A series of prizes "for the best authenticated results when cutting iron and steel with the aid of illuminating or by-product gases, tending to lower the costs of present methods" will be awarded in 1930, 1931 and 1932 by Alexander Milburn Co., Baltimore, Md. These prizes amount to \$1,000 each year, thus aggregating \$3,000. Interested parties and contestants should address the Milburn company for further particulars and rules.

The preliminary announcement of the contest calls attention to the high cost of dissolved acetylene ordinarily used as a fuel gas in the cutting flame, and notes that various substitutes have been exploited for some years. "The most extensive ship scrapping program ever attempted was accomplished with apparatus using coke oven gas." Believing that such processes, which are used to a certain extent in many shops, have not yet been developed to their economic limit, the award has been offered to stimulate experimentation and development.

Non-Financial Incentives Important

Psychological and Economic Effects of Group Bonus Are
Inseparable—Plan Applied to Office Workers

THE importance of good management to the success of an incentive plan was emphasized at a dinner meeting of the New York Metropolitan Section of the Taylor Society, held at the Fraternity Clubs, New York, Thursday evening, Oct. 24. While the program was devoted to a discussion of the group bonus, it was pointed out that in the application of any plan—individual or group—consideration must be given to non-financial as well as financial incentives. The two factors are inseparable, since psychological effects may nullify or accentuate economic considerations. Rate cutting, for example, may dampen the ardor of the employee, because behind his disappointment over the reduced rate is the fear that it may be cut again. Then again the employee's pride may be hurt if he finds that he is working at a lower base rate than a fellow workman on a similar job.

The human side of the problem, in other words, makes it advisable to separate the engineering from the administrative sides of developing a group incentive plan, in the opinion of Dr. C. C. Balderston, industrial research department, Wharton School of Finance and Commerce, Philadelphia. It is one thing scientifically to ascertain "par" for a given job and quite another to set the task for a given group of employees.

Administrative Functions

It is an administrative function to assign the task (to decide whether the base should be easy or difficult), to set the base rate and to select the bonus curve. These are questions of policy demanding the exercise of the best judgment at the command of the management. Whether all gains in efficiency should be given to the worker or divided between the worker and the company must be decided, and also whether the task should be expressed in money (gang piecework) or in time (group bonus). Time standards, if standard throughout an organization, offer the advantage of giving a basis of comparison for control records, said Dr. Balderston. All that is necessary is to express time in standard hours and compare them with actual hours worked, and a percentage of efficiency can be obtained for each group.

Complications Arise from Gang Piecework

Gang piecework has the surface advantage of appearing to be simple, the speaker declared, but it introduces difficulties whenever earnings are

changed among members of small groups. Assume that A has a base rate of 60c. and B a base rate of 40c. and that together they earn \$10 extra. A receives \$6 and B receives \$4. Later B is raised to the 60c. rate and the extra earnings remain at \$10. This sum is now divided evenly and the attitude of A is that B's extra dollar came out of his (A's) pocket.

The group incentive appeals to those who believe in the philosophy of leadership as opposed to the philosophy of driving, declared Dr. Balderston. It emphasizes cooperative effort and teamwork in place of individual self-interest. The star worker is a hazard to others under an individual incentive plan. For example, if he makes too much money the rate may be cut. Under a group plan, on the other hand, the star is the hero of the group.

Leadership vs. Driving

The leadership theory advanced by Dr. Balderston was questioned by Dr. H. S. Person, managing director, Taylor Society, in a brief discussion of the group incentive. The group bonus is a deliberate shifting of the responsibilities of management to the employees, he declared, and may easily result in the gang boss driving the group or individual members driving out weaker members. Whether leadership or driving develops depends on management. It may be added that the kind of group bonus is no less important than the kind of individual incentive in determining whether the workers are driven or led.

Important to Have Minimum of Variables

Dr. Person declared that it is fundamental to the success of any plan that there be the most precise standardization of conditions and that there be a maximum of constants and a minimum of variables. It is not generally appreciated, he said, to what degree conditions can be controlled.

The setting of tasks frequently shows a lack of understanding of the principle that there is no use being more precise in one measurement than in measurements added to it, asserted Gorton James, of the editorial staff of *Business Week*. He said that he has a bone to pick with those who reduce a task to terms carried out to a fraction of a second and then add 40 per cent allowance for fatigue. All time settings are fallible, he believes, because human ability is too variable to be measured with the degree of precision that gets down to fractions.

The way a given plan is presented and the way it affects individuals must be coordinated with the whole problem of management, said Mr. James. It is one thing to work out a scheme. Once it is administered it becomes a labor problem.

Group Plan for Insurance Offices

The application of a group bonus plan to office workers was outlined by H. L. Rhoades, assistant to personnel officer, Metropolitan Life Insurance Co. He referred to what has been done by his company as an experiment, since heretofore incentives have rarely been considered in connection with office employees. The plan adopted now affects about 75 groups, each with its own unit of work. The number in the group varies from nine or ten to 200, with 45 to 50 regarded as the most satisfactory unit. A total of 7300 employees are now working under the arrangement and about 500 will be added before the year is out, bringing the number up to about 80 per cent of the entire office personnel.

Costs are used as the basis for the incentive. Since costs vary widely at different times of the year, a different base is used for each of 13 "months," the year having been divided into 13 equal four-week periods. In each case a four-week period is compared with the standard for that particular "month." This plan was selected because an arrangement was wanted that would make it possible to make payments throughout the year.

Both gains and losses are shared 50-50 with the company. If losses are made they must be made up before the next payment is made. Payments are allotted on the basis of salaries.

For a part of the employees the plan is now in its third year; for others it is in its second year. Results, although not yet regarded as conclusive, have been as follows:

1. The growth of the personnel has been completely halted. Previously the number of employees had increased 8½ to 9 per cent a year, just matching the growth of the company's business.
2. Total gross savings this year will be \$1,750,000.
3. Overtime last year was cut to one-third of what it had been at its lowest.
4. Rate of turnover was cut 25 per cent last year. The reason lay in the fact that total personnel did not increase—turnover is always highest in new employees.
5. Employees' earnings last year increased 22 per cent. Eight per cent was due to the general leveling up of average salaries as a result of the sharp decline

in new workers, and 14 per cent was due to the bonus itself.

6. Office records have shown a very substantial improvement in accuracy.

7. Fair correlation between speed and accuracy seems to exist, although the records of the first year were not conclusive on this point and those of the second year only partially so.

8. The most beneficial effect of the plan has been in developing in the managing heads the ability to manage. They have a definite stake in planning, in forecasting work, in disciplining employees, in studying office methods and procedure. Groups, however, are not given credit for improvements of a major character, such as would result from the introduction of new machinery.

9. The entire plan is carried by five

clerks, by an overhead of one-half of 1 per cent of the bonus payments.

10. There has been a very sharp reduction in controllable absence. The bonus is not paid during absences, whether excused or unexcused. The bonus is divided among those who remain at work.

11. There is greater willingness on the part of the group to take hold of peak loads. The problem of discipline has been partly shifted to the group itself.

R. G. Wagenet, director of the New York Building Congress and chairman of the Metropolitan Section of the society, announced that the next meeting, on Nov. 21, will be devoted to a discussion of the latest developments in industrial management in Russia.

Scrap Buyers Aided by Uniform Standards

Bureau of Standards Receives Commendatory Letters on Results of Simplified Practice Recommendations

ALTHOUGH the classification of iron and steel scrap, adopted in 1926 by the Division of Simplified Practice, Department of Commerce, does not yet enjoy universal acceptance, it has done a great deal toward clarifying the problems of buying and selling such material by specification, according to H. P. Dalzell of the division, who has just completed a survey showing the results and benefits.

Mr. Dalzell has prepared an article on the subject which will appear in the November issue of Commercial Standards Monthly, the news magazine of the Bureau of Standards.

At the meeting in New York last week of the Institute of Scrap Iron and Steel, attention was called to the fact that, though some of the large organizations in the country, such as the American Railway Association and the National Purchasing Agents' Association, have approved the scrap classifications, as now published in Simplified Practice Recommendation No. 58, a great many of the steel companies and other large consumers of scrap adhere to their old specifications. Steel companies, it was said, have specifications for No. 1 heavy melting steel which vary considerably. The scrap institute is working on uniform specifications for all districts and all consumers.

That the results of the adoption of the scrap classification have been beneficial to many consumers is borne out by numerous letters the Bureau of Standards has received, but Mr. Dalzell points out that greater co-operation is needed between producers, dealers and consumers. The Bureau of Standards circularized a large number of consumers, and among the replies received are many of a commendatory character.

The purchasing agent of a company producing steel castings wrote: "We have been able to place orders over the telephone for low phosphorus steel scrap by giving the number of your classification, and with very few exceptions the scrap received was the same scrap that we had in mind when

we made the purchase. We were obliged, up until the time that we accepted your recommendation, to make special trips to inspect the scrap before we placed an order."

The purchasing agent of a machinery manufacturer said: "As a result of using your classification of iron and steel scrap, we have in the past three years been able to effect a very substantial saving in purchases of material for our gray iron foundry. Aside from the actual saving in money, we have been able to avoid misunderstandings with dealers by having a clear understanding as to the materials which they were to furnish."

The secretary of a foundry and machine works informed the Division of Simplified Practice that, "Under the simplified classification of iron and steel scrap accepted by us, we have eliminated grounds for controversy to a large extent, and expedited adjustment in those cases where the material did not meet specifications. It undoubtedly made it easier to purchase the grade and quality of scrap needed, with the added protection and assurance of the least possible chance of misunderstanding between buyer and seller."

Another industrial machinery company said, "We are using the classification of iron and steel scrap regularly with considerable saving, we know, because of the proper segregating of various materials."

The director of purchases of a Middle Western steel corporation wrote that his company is strongly in favor of simplified practices but could give no specific instance of dollars and cents savings. He continues, "However, we are thoroughly convinced that the scrap business is on a more business-like basis today than ever before, and we are getting a better grade of material for the same price than we formerly received. There is a better understanding of the scrap classification and this, we feel, is conducive to economy. It has also helped the consumer in the way

of according him protection against unscrupulous traders."

Another steel foundry and machine company said: "Referring particularly in our case to classification of iron and steel scrap, we find that there is greater care taken by the dealers in scrap to avoid misrepresentation in the grades that they are selling. We feel that the results are very satisfactory since we have had fewer rejections on account of inferior quality, both in chemical analysis and the physical structure of scrap."

An officer of one of the country's foremost motor companies wrote: "We cannot give you any report in dollars and cents, but we can say that the efforts made in the direction of simplified practice are making themselves manifest. Our interest was at first centered in that phase dealing with grading of scrap from a producer standpoint. We have found that these classifications recommended and adopted, as far as they may cover our particular grades, are recognized by consuming mills. However, the benefits we will derive from the broad use of simplified practice will be far reaching."

Chicago Interests Oppose Reopening Steel Rate Case

WASHINGTON, Oct. 29. — Independent iron and steel interests of the Chicago district have filed a petition with the Interstate Commerce Commission vigorously opposing the request of the railroads for reopening of the Official Classification territory steel rate case for rehearing as to the general level of the rates prescribed. Revenue losses claimed by the carriers in Trunk Line, New England and Central Freight Association territories, the Chicago interests said, fail to include the revenue figures for Illinois Freight Association territory "in which many of the Central Freight Association lines operate and in which territory they would receive substantial increased earnings as a result of the commission's scale 'F' rates." The scale referred to is the one set up to apply to all of Official Classification territory except New England whose scale is 10 per cent higher.

The Chicago manufacturers insisted that if the proceeding is reopened as to the general level of the scales the carriers in the entire territory shall present revenue studies for a current period throughout the entire territory. The petitioners were the Acme Steel Co., Clayton Mark & Co., Inland Steel Co., Interstate Iron & Steel, Joseph T. Ryerson & Son, Inc., and the Crane Co.

The State Corporation Commission of Virginia has filed a petition with the Interstate Commerce Commission asking that the proceeding be reopened and that that portion of Virginia on and north of the main line of the Norfolk & Western Railroad from Norfolk to Bristol be included in Official Classification territory so that this section may also be granted the rates prescribed.

Scrap Industry to Engage in Research

Institute to Create Special Fund of \$50,000 to Carry
on Various Constructive Activities

RESearch, as a means of improving conditions in the scrap iron and steel industry, widening markets and conserving the natural resources of the country, was the keynote of the meeting of the national advisory council of the Institute of Scrap Iron and Steel at the Hotel Commodore, New York, last week.

Cooperation with scrap consumers, the freight rate structure on old material, unfair competition among dealers and brokers in scrap, and the organization of a scrap export association under the Webb-Pomerene law were among the other subjects discussed.

The national advisory council decided to conduct an immediate survey involving the investment, employment and scope of the scrap industry and the production, consumption and distribution of scrap. It also decided to prepare a case to be presented to the Interstate Commerce Commission seeking a reconsideration of freight rates on scrap. A working fund of \$50,000, in addition to the annual dues paid by members, will be created to carry on the various activities which the institute has planned.

The next annual meeting will be held in Chicago in March, 1930.

A frank discussion of the problems of the industry, such as has rarely taken place at a meeting of scrap dealers, characterized the two-day conference. Representative dealers from all sections of the country representing the 12 chapters of the institute were in attendance.

Unfair Competition Criticized

Unfair competition among the scrap dealers was sharply criticized by Benjamin Schwartz, director general of the institute, whose leadership of the scrap industry toward a better background, better ethics and better practices has been apparent to those who have watched the institute's activities in the past year.

"It seems that the scrap iron business has been conducted by intuition and not by facts," said Mr. Schwartz. "Intuition found the dealers long or short of the market, but it rarely found them with an assured profit, based on the facts of merchandising. Nobody was interested to plan ahead for the future of the industry. Nobody has been interested, because we, ourselves, were never interested in our future. One must search far and wide to find an industry like this one, that has operated in the dark, that has submitted in silence to circumstances which should have been corrected, and that stood by complacently while

events were happening which should have been correctly interpreted.

Signs of Times Ignored

"One of the so-called trade customs that seems to have the sanction of law in this industry is the privilege or custom of one dealer cutting his own, as well as his competitor's, throat. This questionable privilege has been jealously guarded and preserved for years past, while on all sides of the industry cooperation, mergers and adjustment to modern conditions were flashing signals to the scrap iron dealers that were completely ignored. It is a rare dealer who knows the cost of his operations, or knowing it, knows how to use such knowledge. The psychology that has prevailed has been 'What can I lose?', and not 'How much profit can I make?' It is a rare dealer who has included in his vocabulary the simple word 'No,' when faced with a proposition on which he should know he cannot make a profit, were he to consider himself as a merchant of service or a manufacturer, as he properly should be. The mania for volume, without regard to the interests of competitors, has created a menace that will prove a boomerang to those who live by this rule. The problem in this industry is not price cutting but price boosting in the purchase of the materials of this business.

"The scrap iron industry must dig into the facts and must learn to face them. The knowledge of the few, which has been erroneously considered the secrets of the trade, must be made the possession of the industry. With the changes that will inevitably occur in the scrap iron industry in the next few years, this industry can benefit from the successful experience of American business by calling upon research to improve its service and create greater markets.

"This constructive program must be undertaken, if the scrap iron industry is to be recognized as an industry, and if it is to be in a position to demand certain fundamental rights, without which no business relationship can be profitable. The signs of the times all point to the elimination of business men or of an industry that does not keep pace with the progress of American business, that refuses to adjust itself to conditions, that continues to function blindly on the basis of intuition and speculation. The Institute of Scrap Iron and Steel has fortunately arrived at a time when men are beginning to realize the value of organization, when men are beginning to sense an industrial responsi-

bility and consciousness. This program should be placed in the hands of leaders who have vision and the interests of the industry beyond their own selfish concern. The institute should be strengthened to meet its opportunities and demands for service. There can be no denying that the future of the industry is now inextricably tied up with the future of the institute and as the institute goes, so will the measure of the scrap iron industry be taken."

Export Corporation Proposed

The organization of an export corporation for scrap iron and steel was recommended by Luther Becker, chief of the iron and steel division of the Department of Commerce, at the dinner which closed the conference. According to figures submitted by Mr. Becker, 516,139 tons of scrap iron and steel were exported by the United States during 1928, approximately five times the tonnage exported in 1926. His address will be printed in a later issue.

The value of business statistics was emphasized by C. E. Wright, associate editor, *THE IRON AGE*, who said that the scrap industry was almost in a class by itself in that no reliable data regarding production, consumption and distribution of scrap have ever been gathered.

"While the members of the scrap industry may be the principal beneficiaries of the information to be gleaned from scrap statistics, a survey of the business should not be approached from a merely selfish point of view," Mr. Wright said. "The publication of such statistics should be of interest and value to producers and users of scrap and to the carriers of scrap, the railroads, and all of them should be willing to contribute their share of information to such a survey as the institute has planned."

He added that accurate facts of the industry are becoming more essential because of the trend of the industry away from speculative buying and toward merchandising of the product on a cost plus basis.

Buyers No Longer Misled

"Buyers are no longer misled by reports of scrap shortages," he said, "and it behooves you, as dealers and brokers, to know the obtainable facts of your industry so thoroughly that neither buyers nor sellers will be misled by rumors or propaganda set in motion to influence demand or prices."

Walter S. Doxsey, editor of the *Daily Metal Trade*, spoke of the value of research work in scrap, particu-

larly in establishing markets for alloy steel scrap through organization of the gathering and preparation of such scrap, which is a factor of growing importance to steel companies and scrap dealers alike.

Research Program Comprehensive

The research program, as outlined by E. G. Howell, Chicago, chairman of the research committee, covered five fields: 1, A survey of the industry; 2, specifications; 3, conservation, with special reference to alloys; 4, methods of operation, including cost accounting; 5, economics of the industry, including the problem of direct dealing between producers and consumers of scrap.

The trade customs committee, of which Harry Ehrlich, Springfield, Mass., is chairman, submitted a series of clauses to be included in a uniform contract, which it is planned to formulate for the scrap iron industry.

The trade relations committee, of which Charles Dreifus, Pittsburgh, is chairman, reported that it had heard evidence in five cases filed with the institute by leading consumers of scrap, involving violations of the code of business practices and had adopted measures to prevent a recurrence of these complaints.

At this meeting, a program of cooperation with consumers was outlined by Mr. Schwartz. "The Institute of Scrap Iron and Steel," he said, "has already given sufficient evidence of its sincerity of purpose and of its usefulness to the steel industry. It has furthermore demonstrated that there is no conflict between the best interests of the consumers and of the scrap iron dealers. There is a great field of cooperation between consumers and the institute which has yet to be developed, which should result in better and less costly scrap, a freer movement of this commodity, wider markets and full utilization of these by-products of American industry."

Economics of Direct Dealing

"The economics of direct dealing between consumer and producer should be carefully examined by the consumers. If the increasing practice of some consumers in securing their scrap without regard to the elements of fair competition with other consumers is countenanced by the steel industry, it will not be long before a system of undesirable competition in securing scrap will develop among the mills, a situation which they should not desire to see injected into the steel industry. The consum-

ers will realize, if they have not already, that they cannot get service out of the scrap iron industry in times when their operations are high, if the scrap iron industry is prevented from operating. It ought to be evident that one cannot stifle and revive an industry at will.

"Cooperative discussion may not only prevent costly competition among the mills, but may also bring about a re-examination of the buying methods of some, which have created a paradox of increased costs of scrap for themselves and reduced profits to the dealers. Scrap is too important a commodity to the steel industry to allow it to be made the subject of a battle of wits.

Clarification of Specifications Needed

"Specifications of scrap and their interpretation could be discussed to the mutual advantage of consumer and dealer. In many cases, specifications still prevail that were framed many years ago and have not kept

pace with the demands and conditions of American industry.

"The conservation of natural resources by the fullest utilization of all sources of scrap, especially alloys, which has assumed increasing importance, can be brought about by cooperation. Research into markets and freight rates, contemplated by the institute, with the cooperation of the consumers, would inevitably result in a freer distribution of scrap.

"The Institute of Scrap Iron and Steel is an appeal to the responsible leadership of the steel industry. It is hoped that a representative forum of leadership in the steel industry will be available in the near future for a consideration of these matters, so that there will be no necessity to seek advice and cooperation outside of the industry. This cooperation should be based on recognition of the service of the scrap iron industry and on recognition of the fact that this service is entitled to a fair return and consideration."

Two-Motor Direct Drive for Blooming Mill

WHAT constitutes a two-motor direct drive for rolling mills, replacing the conventional drive with pinions, is indicated in the accompanying sketch. The drawing will serve to illustrate the 10,000 hp. in twin motors which the Illinois Steel Co. has arranged to install at its South Works for a 54-in. blooming mill. The equipment will include two 5000-hp. of 40 to 80 r.p.m. speed, a 9000-kw. motor generator having a 6500-hp. driving motor and a 180,000-lb. 15-ft. diameter steel-plate flywheel and the necessary control apparatus. The entire equipment will be supplied by Westinghouse Electric & Mfg. Co.

The development of this direct drive is one of the outstanding recent advances in rolling mill design. By using an individual motor for both the upper and lower rolls, the pinions and couplings required for the single motor drive are eliminated. The motors are reversing, and a means of maintaining correct speed relations is provided. Considering first cost, maintenance charges and friction losses, R. H. Wright, steel mill engineer of the Westinghouse company, considers the twin-motor drive as thoroughly logical, whether comparison is made with the single motor drive employing pinions or drives calling for high-

er speed motors with speed reduction units.

Metallurgical Uses of Natural Gas

The probability that the development of metallurgical uses for natural gas may stimulate the growth of chemical and metallurgical industries on the Pacific Coast is suggested by the United States Bureau of Mines. The Pacific Experiment Station of the Bureau, located at Berkeley, Cal., has recently had many requests for information concerning possible metallurgical uses for natural gas.

It seems possible that, for strictly metallurgical or chemical uses, that is, aside from the use for direct production of power, the fields of greatest theoretical interest will be the manufacture of hydrogen for ammonia syntheses, and the direct reduction of such oxides as zinc or iron. Although the direct manufacture of hydrogen from methane is possible, it seems that the most economic method for producing the pure hydrogen required for ammonia syntheses will be by the action of steam on metallic iron, the iron oxides so produced being again reduced to metal by the use of the natural gas.



Westinghouse Two-Motor Direct Drive for Blooming Mill at South Works of Illinois Steel Co.

Distribution, Research, Workers

Topics Covered by Industrial Engineers Have Expanded
—Wage Incentives and Mechanization—Many
Skilled Men Still Needed

TRENDS in business was the major subject for discussion at the sixteenth national convention of the Society of Industrial Engineers, held at the Hotel Statler, Cleveland, Oct. 23, 24 and 25. Trends pointed out by some of the speakers covered broadening the field of the industrial engineer to include problems of distribution, merging distribution facilities, paying greater attention to research work, adoption of better business methods forced on manufacturers by economic pressure, the tremendous

development of greatly improved machine tools and the more general adoption of wage incentive plans. Mechanization of industry, it was pointed out, is not eliminating skilled mechanics, but rather is causing changes in skills and the shifting of skilled labor from some industries to others. Although some industries do not require as many skilled workers as formerly because of the increase of machinery and greater unit production, it was declared that there is a shortage of skilled labor.

Wider Conception of Field of Industrial Problems

THE broadened scope of the field of industrial engineers was stressed by Dr. W. F. Rittman, Carnegie Institute of Technology, president of the society, in a brief opening address. The society's activities, he said, were formerly limited to problems of production but now the members devote their attention to production, distribution and finance. Referring to the important problems of distribution, he mentioned the wide spread between the cost of production and the cost of the product to the ultimate consumer.

Distribution is a tangible engineer's problem and will be solved by engineers, declared Irving S. Paull, president Institute of Carpet Manufacturers of America, Inc., in a talk on trends in distribution and their effect on the future of industry. Years ago, he said, it was claimed that the cost of production could not be determined but it was determined. Now it is said that we cannot know the cost of distribution, but he believes this will be solved. He divided the making and marketing of merchandise into three functions — manufacturing, wholesaling and retailing. The manufacturer has completed his function when he has delivered his product to the wholesaler. Some manufacturers assume the function of wholesaling and others also assume the function of retailing. However, if they take over these functions they assume the expenses of wholesaling and retailing, but perhaps may be able to effect some economies.

Merging Distribution Facilities

The trend in distribution, according to the speaker, is toward merging distribution facilities as a relief from economic pressure. Pressure is being applied for precision in management. Broadest knowledge of its own industry is not enough for present-day management, he held. Management

must have knowledge of other industries, because of the competition between industries.

There is a trend in the direction of vertical merging under one management, with two outstanding problems, manufacturing and distribution. Many manufacturers have no conception of the cost of wholesaling, and they do not save by assuming the duties of wholesaling.

He referred to the manufacture of goods which are inferior, because of adulteration, poor workmanship or for some other reason, to meet the pressure of competition, and said that this can be carried to a point which would result in abuse of the consumer. Establishment of minimum standards of quality, he declared, is one of the big problems of industry.

There is a tremendous waste in distribution; if that waste is taken from the cost to the consumer, the buying power of the latter would be increased in other directions. In 1900 48 per cent of production was in the essentials of living; this has been reduced to 32 per cent, in 1923. He believes that at present not over 28 per cent of production is for the bare necessities of existence. Physical requirements are now well supplied and he believes that future progress in industry will be in the matter of supplying the metal requirements.

Application of Intelligence to Management

Trends in industrial production and management were discussed by L. P. Alford, vice-president Ronald Press Co., New York. Various facts brought out by the Hoover report on recent economic changes, such as increase in production and decrease in number of wage workers, were referred to by the speaker. Never before, he said, has there been so much application of intelligence to the management of industry and to research.

He attributed one-half of the advancement in industry to the utilization of industrial management. Returns from industrial research could be placed at ten-fold. This has been devoted largely to the improvement of present production, rather than bringing out new products. No doctrine has spread so fast as that of high wages; high wages and high production go together.

Among trends in industry are mechanization, simplification, shorter hours and reduction in working forces, the surplus labor being absorbed in other fields without hardship. The automotive industry, he said, shows the greatest gain in increase in production, the increase in this industry per man-hour being 139 per cent. Industries which are decadent will disappear, he declared. Executives out of step with modern conditions will be forced out. Others will continue to progress. Outside economic pressure will keep them on their toes.

Making It Pay to Work Well

WAGE incentive was the subject of one general session. A committee to study compensation methods and incentive plans was appointed by the society a year ago; this committee's report was submitted in three papers. In addition, Adolph Langsner, Eugene Dietzgen Co., Chicago, who presided, gave a summary of a report on an independent study that he had made of compensation methods and financial incentive plans.

He found that plants making the same products often use different incentive plans. He discovered 36 different plans in operation, and declared that a classification of various plans is necessary. Incentive plans should not be a tool to make work hard, he said, but rather a tool to eliminate

waste and develop a cordial relationship with the management.

Nearly Half Are On Time Rates

Forty per cent of employees are still working on day or hour rates. He classed other methods of paying as piece rate, premium or bonus and profit sharing—including in the latter pensions and life insurance. The speaker showed in a series of charts the extent of compensation methods in various industries. Piece rate is far in the lead in the automotive industry. In the metal-working industry the day rate is somewhat ahead of piece rate and bonus system.

Human factors of wage incentives were discussed in a report by Eugene E. Brey, Wilson Western Sporting Goods Co., Chicago. He treated the subject largely from the standpoint of the psychological effect that incentive plans have on workers. Wages, he said, are only one incentive. The appeal of the plan to the worker should be wider than the mere financial reward. The relation between production and reward should be definitely established.

An incentive plan among other features should be simple and equitable; the base rate should not be below the going wage rate, the reward should be direct, sure and permanent, there should be a proper ratio between the reward and production, workers should be able to compare earnings with performance and payments for reward should be made separate from the regular wage payments.

Taking The Worker Into The Business

There is a tendency, he said, toward making workers parties to the administration of an incentive plan, and this has its advantages. As a definite trend in industry, he said that wage incentive plans are being adopted by those companies which are forging ahead.

A careful examination of various incentive plans should be made before one is adopted, said Alfred G. Trembly, Teletype Corporation, Chicago, in a report on wage incentive formulae compared and evaluated. The manager, he said, is confused as to the system it would be best for him to adopt. The speaker's recommendation was that the manager analyze each plan in connection with conditions in his own plant. He showed on charts a proposed method of making wage plan comparisons.

Supervisory Force and Its Bonus

Incentives for office workers, supervisors and executives were discussed by John Paul Jones, Standard Oil Co. of Indiana, Whiting, Ind. He said measuring devices could be devised for executives, office help, employment managers and maintenance men. These measuring devices would include psychological principles. The same sets of principles followed in the shops would apply.

There are two plans for applying incentives to supervisors. One plan is based on departmental efficiency

and the other on cost bonuses, the latter being more generally applied. He referred to a Chicago steel plant that had adopted a cost bonus system with very satisfactory results. Incentives for executives, he said, are usually based on profits and are successfully used in many plants. He believes there will be an increasing tendency to adopt incentive plans for office workers and executives.

Automatic Manufacturing

The machine age and its effect on industry was discussed by Richard H. Lansburgh, professor of industry, University of Pennsylvania, at a session presided over by C. E. Knoepfel, Cleveland. The new mechanization of industry, Professor Lansburgh said, is unlike any previous move in that direction. It has come about largely through the application of science to industrial problems.

In addition to replacing men by the development of improved machines, a large amount of unskilled labor has been displaced by conveyor equipment. Skill has been displaced by machines and scientific recording instruments. The speaker referred to the textile, pottery and cigar-making industries as among those which have reduced labor by improved machinery and handling equipment.

Machine Tools Revolutionized

Turning to the metal industry, he said that today, when a new part is to be produced, the manager's first thought is as to whether an automatic machine can be developed to do the work. Professor Lansburgh reviewed some of the developments of machine tools and pointed out their effect. The machine tool industry has seen its product revolutionized, he declared, and the productivity of tools has been increased two to four times. Not only have special machines been developed, but standard tools have been greatly improved. Fully automatic machines have become commonplace.

Among the improvements which have increased production which he mentioned are increase in speeds and feeds, the hydraulic feed, which he said is now used on 70 lines of tools, and centerless grinders. He mentioned also new developments in attachments, jigs and fixtures and the possibility of further speeding up by the use of the new tungsten-carbide cutting tools.

We Still Need Skilled Men

Skilled men, he said, are not being eliminated by the substitution of machines, but skills are changing and new skills are being developed in handling machines. Numerous new sources have been opened up for metal workers and the industry is in a healthy condition, except for a dearth of high-grade mechanics. Temporary maladjustments of labor must be fixed by managements.

Another problem that confronts managers is the obsolescence of machinery due to frequent changes. Unless profits are high, good machinery

used only for a short time cannot be thrown out for other tools having greater output. Executives of today, he said, must be in the forefront of machinery development, and must also be able to visualize the development of machines that have not yet been produced. He also must realize the social effect of shifting men from one industry to another.

Discussion of the machine age was led by Clifton Reeves, vice-president Mullins Mfg. Co., Salem, Ohio, who referred to the economic and other problems that have developed. The reallocation of labor, which must find new avenues of employment, he said, is a great problem.

Apprentice Training an Urgent Necessity

"Trend in Industry Demands More Skilled Mechanics" was the subject of a talk by C. J. Freund, apprentice supervisor of the Falk Corporation, Milwaukee. He could not tell whether there had been a reduction in skilled mechanics, because there has been no recent survey. He pointed out that, while a machine operator in a production shop is not a skilled workman, there are numerous other jobs in the shop requiring skilled labor, such as foremen, inspectors, repair men, time-study men, who together make the machine operator's job possible.

The speaker pointed to the danger in making a survey in two or three plants in which the mechanical processes are highly developed, and drawing conclusions therefrom. He presented a classification of workers in the plant of the A. O. Smith Co., Milwaukee, which showed that 33 per cent of the shop employees are skilled mechanics. In the shop department of the Falk corporation 26 per cent are skilled mechanics. He warned managers that they are not training enough apprentices. Every manufacturer, he said, should train its proper quota of apprentices.

Discussion of Mr. Freund's talk was led by W. E. Odom, director of the Department of Industrial Relations, National Metal Trades Association, who declared that a shortage exists in skilled mechanics. Shops of the association are now training 5000 to 6000 apprentice boys, but he said that this number must be greatly increased to overcome the shortage. Foremen are being recruited from the ranks of skilled mechanics and more supervision is needed than ever before. The solution of the problem, he said, is apprenticeship training.

Relations with Entering Employees

How applicants for work are handled in the employment department of the Frigidaire Corporation, Dayton, Ohio, was told in an interesting talk by Dr. Harry Myers, director of personnel of that corporation. His subject was "A New Concept of Personal Relations in Industry."

Bigness in mass production, he said, is squeezing out the human relationship. The first hard job in the employment department is to change the

attitude of men toward work and to teach them how to work. A large share of the applicants do not want to work; they simply want to get on the payroll. An attempt is made to change their viewpoint regarding work before they are interviewed. The company has laid down six rules, which are impressed upon job applicants:

1. Be clean and orderly.
2. Take good care of property, equipment and materials.
3. Follow instructions willingly.
4. Work well from whistle to whistle.
5. Work every day and tell your foreman when you cannot.
6. Work well with others.

Dr. Myers declared that many plant managers do not know where their employment departments are except from seeing the location on blue prints. In his opinion they could very profitably spend an occasional hour or two in the employment department, where they would get some direct information on the problems of the employment manager. Discussion was led by Glenn Forrester, personnel manager DuPont Rayon Co., Buffalo.

Age Limits and Pensions

A report prepared by the committee on research was made by Myron T. Jones, personnel consulting engineer, Cleveland, on limiting ages of industrial workers. It was brought out in the survey that the solution of the problem of age limits was made more difficult because industrial pension systems and joint insurance would put heavy loads on some companies if they applied no age limit.

A questionnaire on the subject was sent to a selected list of employees. Of the replies received, four were in favor of definite age limit for employment, one in favor of a qualified limit, 104 were against any limit and three were for a qualified no limit. Fifty-five per cent were in favor of and 45 per cent against a scientific pension system under state control. The necessity of providing for the support of aged men was stressed. They must have means of earning a living or be put on an old age pension. The committee declared that there is no one solution of the problems involved, and recommended further research of the subject.

George T. Trundle, Jr., Trundle Engineering Co., Cleveland, who led the discussion, said that there is another group to worry about besides the factory workers. That group consists of factory managers, superintendents, production men and others from 45 to 60 years of age, who have been squeezed out of their places of employment by mergers and for other reasons, and who often have great difficulty in finding new openings.

Time Study by Cinema

Application of the motion picture camera to time-study work and analysis was discussed at a meeting of the time-study engineering standardization committee by Allen D. Jennings, Cleveland, who has been engaged in

development work along this line. His talk was illustrated with motion pictures taken for time-study purposes in the packing department of a Cleveland department store.

The motion picture film, Mr. Jennings pointed out, can be made a valuable instrument for measuring time and motions and to bring out the intricacies in operations which can hardly be caught with the eye. Another use which he believes will prove of great value will be for the training of employees by photography. Instead of taking a new man directly in to the machine he is to operate, he would first be made familiar with the operation by motion pictures and see the right way of doing it.

Progress of the various sub-committees on time-study standardization was reported by Thomas R. Hough, Wilson & Co., Chicago, chairman of the committee, and by heads of some of the sub-committees. These reports indicated that the committees have done a great deal of research work and that their reports are well under way. These after editing will be published in book form, for the use of time-study men and as text books in colleges.

Accounting Methods Need Revision

A revolution in accounting methods was predicted by C. Charter Harrison, Stevenson, Harrison & Jordan, Chicago, who discussed "Is the Present-Day Accountant Doomed to Extinction?" The industrial accountant of tomorrow, he said, will be entirely different from the accountant of today, due to change in industrial conditions.

The factory formerly occupied the first position in the industrial structure, he declared. But the factory now has taken second place to the sales department, due to the fact that the production capacity of industries has been increased to such an extent that it is well in excess of the demand. Discussion was led by E. S. LaRose, Bausch & Lomb Optical Co., Rochester. Trends in supervision were discussed at the same session by G. E. Schultz, consulting engineer, New York.

The sessions included a fatigue-committee dinner meeting which was presided over by George H. Shepard, Purdue University, chairman of the committee on elimination of unnecessary fatigue. Fatigue and rest periods were discussed by A. B. Segur, consulting engineer, Oak Park, Ill., who gave a practical demonstration of motion time studies. Effects of noise on industrial workers were discussed by R. F. Norris, C. F. Burgess Laboratories, Inc., Madison, Wis.

A session was held by the maintenance group, presided over by Perry A. Fellows, city engineer, Detroit. Trends in maintenance planning were discussed by H. E. Ramsey, industrial engineer, Philadelphia Rubber Works, Akron, Ohio; better planning for plant alterations by Milton F. Wagnitz, engineer of public structures, Detroit; and smoke abatement practice for maintenance men by Charles

J. McCabe, chief smoke inspector, Detroit.

The New Officers

At a meeting of the board of directors John M. Carmody, editor *Factory and Industrial Management*, Chicago, was elected president. Eugene A. Rummler, Rummler & Rummler, Chicago, was named as treasurer and George C. Dent as executive secretary, both being re-elected. The four vice-presidents were re-elected. They are Albion N. Doe, consulting industrial engineer, New York, vice-president in charge of promotion; Perry A. Fellows, city engineer, Detroit, vice-president in charge of research; John Calder, Springfield, Mass., director in charge of industrial relations of the International Y.M.C.A., Eastern regional vice-president; and C. H. Gullion, industrial engineer, Swift & Co., Chicago, regional vice-president for the Middle West.

President Rittman presided over the annual dinner, held Thursday evening. The principal speaker was the new president, John M. Carmody, who discussed the merger age in industry.

Morning and evening sessions were held, leaving the afternoons for plant visitations. Among the plants visited were Nela Park plant of the General Electric Co., White Sewing Machine Corporation, Industrial Rayon Co., Cleveland Electric Illuminating Co., and Allyne-Ryan Foundry Co., Cleveland, and B. F. Goodrich Co., and Goodyear Tire & Rubber Co., Akron.

Aircraft Lull Seasonal, Says Kinner Sales Head

"The present lull in aircraft production is no indication whatever in computing business for 1930 and the future," says R. Ernest Tucker, head of the sales and service department of the Kinner Airplane & Motor Corporation, Glendale, Cal.

"Many aircraft manufacturers," he says, "have held up production because of delay in receiving their approved type certificates; also the aircraft business has grown so rapidly that many manufacturers have not had adequate time to build up their sales organizations as they should."

"Although the aircraft business will be undoubtedly somewhat seasonal, as is the automobile business, foreign trade will offset this fall and winter decrease."

Foundrymen's Transactions to Appear Monthly

A monthly publication is to be issued by the American Foundrymen's Association commencing Jan. 15, 1930. The board of directors has unanimously approved a plan to print its *Transactions* each month instead of yearly. The monthly issue will displace the quarterly *Bulletin*, the last number of which will be issued in November. The *Transactions* will include papers and discussions at annual conventions.

Tool Builders to Hold Show in 1932

Association at Annual Meeting Decides Upon Three-Year Interval Between Expositions and Upon Expansion of Activities

THE next National Machine Tool Exposition will be held in Cleveland in 1932. This decision was reached by a majority of the delegates attending the twenty-eighth annual meeting of the National Machine Tool Builders' Association at Briarcliff Lodge, Briarcliff Manor, N. Y., Oct. 21, 22 and 23. Although a considerable minority favored an exposition two years hence, the advantages of a longer interval between shows made the three-year period seem preferable.

By a unanimous vote the delegates approved the expansion of the association's activities during the coming year. Numerous group meetings were conducted during the convention and much was accomplished looking toward a betterment of trade practices. Seventy-seven companies were represented at the convention by 135 delegates.

C. A. Johnson, president, Gisholt Machine Co., Madison, Wis., was elected president of the association by the board of directors. Howard W. Dunbar, works manager, Grinding Machine Division, Norton Co., Worcester, Mass., will serve as first vice-president; Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., second vice-president; and Frederick V. Geier, vice-president, Cincinnati Milling Machine Co., Cincinnati, treasurer. Directors named for a three-year period by the association are C. R. Burt, vice-president and general manager, Pratt & Whitney Co., Hartford, Conn.; George E. Randles, president, Foote-Burt Co., Cleveland; and Mr. Gaylord.

Industrial Statistics Discussed

An outstanding contribution to the convention was an address by Virgil Jordan, economist of the McGraw-Hill Publishing Co., New York, who took for his topic "Industrial Statistics as Tools of Business Management." He pointed out that business today is undergoing a rather marked reaction in some lines from the unwise and uncontrolled expansion during the past year. Mr. Jordan said, in part:

"The stock market set the pace for this reckless discounting of the future and is paying the price first and most emphatically. Creeping bears are an improvement on wild bulls. Automobiles, building and steel are showing the effects of excessive bullishness. But the general business situation remains fundamentally normal and sound. The growth of general



C. A. JOHNSON, newly-elected president of the association, has been head since 1908 of the Gisholt Machine Co., Madison, Wis., which was founded by his father, John A. Johnson

trade is proceeding at its usual regular and steady rate, and some of the industrial weak sisters like coal and textiles, who have been pushed aside for some years by the rather wild rush of the heavier industries, are picking up courage to show what they can do.

"The unbalanced situation is due in large part to failure to make the best use of the statistical guides to business conditions which are now available. Despite the enormous mass of statistics available today, individual industries and business men make very little use of them in determining their business policies, and what use they do make of them is frequently wrong or misleading. Our knowledge of general business movements is far from complete, but it is sufficient to provide the individual concern with a fairly good guide in planning production and sales programs. If each industry would attempt more carefully to adjust its policies to the general rate of business growth instead of trying constantly to break step and steal a march on the country as a whole, such recurrent fluctuations, readjustments and disappointments

as we are now experiencing could be avoided.

"The general and quite superfluous anxiety about the business situation at the present time is a striking illustration of the immature and unrealistic attitude which still prevails among business men and the general public toward economic conditions in this country. Despite all the solemn assurances we have been given about the increased stability and scientific control of American business, the fact is that American business psychology is still in the grip of a chronic boom and depression complex—a hangover from the glorious and terrible experiences of an economic childhood which it has not yet outgrown.

Business Does Not Seek Stability

"The fact is that we haven't had any greater stability in most important lines of industry since the war, because American business is not interested in stability. It is not satisfied with the steady and regular growth which general trade should normally have in a highly developed country like this. It is interested only in spectacular record-breaking performances. Unless things keep on going up forever at a dizzy pace year after year it feels that the country is going to the dogs. It forgets that every excessive expansion in any line beyond the normal expansion of the market has to be paid for by a corresponding falling off in some other field and finally in the record breaker's own line as well. There is no realization that sustained general prosperity depends upon control coordination and balance in our business activity as a whole."

In the gathering of industrial statistical information, said Mr. Jordan, trade organizations must be chiefly relied upon. They can secure, tabulate and disseminate the data more quickly than governmental agencies. The main reason why the individual company should contribute its share of information in regard to orders, shipments and cancellations is that it will not know what others in its own line of manufacture are doing without the collective data which cannot be gotten unless it participates in the effort.

Apprenticeship Training Urged

Henry Buker, vice-president, Brown & Sharpe Mfg. Co., Providence, R. I., in his address as president of the association, stressed the value of ap-



H. W. DUNBAR, works manager, Grinding Machine Division, Norton Co., Worcester, Mass., is the new first vice-president.

thoughts and habits of the men under them. An apprenticeship course, properly handled, is the very best school from which to draw future factory executives. Any concern, no matter how small, which does not have such a course is neglecting a real opportunity.

"I believe that the general manager of a business should either interview each apprentice at least two or three times during his apprenticeship training, or should delegate a committee of three, composed possibly of the factory manager, sales manager and chief engineer, to talk with the boys occasionally and find out, as far as possible, the boys' leanings and aspirations.

Apprentices Should Not Be Misjudged

"There have been many apprentice boys who have been failures in the shop, but who have proved to be exceptional designers or salesmen. The shop foreman is often inclined to judge a boy solely by his ability to produce work accurately and cheaply. Some of our most brilliant men are naturally clumsy with their hands, and we have all known good executives who could tell others what should be done and how to do it, but could not do the work themselves if called upon to do so. Frequently, the boy with initiative and a brilliant, inquiring mind causes more or less annoyance to his foreman, whereas the quiet, patient artisan type, who asks no questions and does his work methodically and well, wins very high praise, although he does not have the least trace of executive ability.

"Many concerns have remarkable executive material among their apprentices about which they never know, because the management does not actually seek for signs of such ability among the boys, but rather



R. M. GAYLORD, president, Ingersoll Milling Machine Co., Rockford, Ill., will serve as second vice-president and a director.

apprenticeship training to the individual shop as well as to the industry in general. He said that it is especially desirable to have good apprenticeship courses in shops located in communities where there are few or no other shops offering such training. He suggested that a rigid schedule be laid out and followed carefully. The very rigidity of such a course would be much in its favor, for it would take a young man at the age when he is susceptible to influence and train him along definite lines.

"You need as your assistant foremen and foremen," stated Mr. Buker, "men who have received a thorough training and whose habits and experiences have been such as to make them understand sympathetically the

leaves it to the men down the line to bring such ability to their attention. How can you expect an assistant foreman, who has always thought in terms of his own work, to point out to you a potential Ralph Flanders, a Clayton Burt or an Ambrose Swasey?

"Today many of our factories are coming gradually into the hands of the second generation, and unless they find an apprenticeship system already installed in their shop, some of them are likely, because of their own training or lack of it, to feel that such a course is not necessary. I am a very great believer in an apprenticeship training for every boy who expects to take a responsible position in the factory end of a machine tool busi-



H. BUKER, vice-president, Brown & Sharpe Mfg. Co., Providence, R. I., is the retiring president.



A. H. TUCHER, president, Cincinnati Bickford Tool Co., retiring as treasurer.



F. V. GEIER, vice-president, Cincinnati Milling Machine Co., is the new treasurer.



G. E. RANGLES, president, Foote-Burt Co., Cleveland, elected a director.



C. R. BURT, president and general manager, Pratt & Whitney Co., Hartford, Conn., elected a director.

ness. Many have succeeded without such training, but you will find that in nearly all cases, they have had practical men associated with them."

Companies Hold To Published Prices

In discussing certain trade practices, Mr. Buker declared that "there is no reason why any manufacturer should offer any more for a used machine than it is actually worth to him, either in his own factory or for resale purposes. It speaks very highly of the progress we have made in recent years that today there are very few machine tool concerns in the country which would not feel cheapened in their own minds as well as in the minds of their competitors if they were deliberately to cut the published price of their machines in competition. When the industry as a whole can be brought to the same feeling in regard to cutting prices by the subterfuge of taking in used machinery at a loss, we shall have no further trouble because of this practice."

In his report as general manager of the association, E. F. DuBrul said that when the calendar year 1929 is completed, the order volume of this year will doubtless exceed the orders for 1920 and probably those for 1919. "We have only 400 more points to go to equal the 1919 figure; we have three months to do it in and our last quarter's orders ran better than 200 points per month. So in business booked, this year will most likely be the best in the 11 years covered by our index. The net earnings of the industry for the last 18 months should show up decidedly better than for any similar period since the war. Perhaps they may show better than for any similar period before."

Mr. DuBrul emphasized that although some recession is going on in business generally, it is not likely to reach the low point made in 1927. The interest displayed by visitors at the recent Cleveland Show indicates much "ability-to-pay and will-to-buy," which should be turned into sales during a number of months to come. He stressed the fact that some falling off in orders should give the industry a chance to relieve production pressure.

Many Groups Reporting Data

The association, said Mr. DuBrul, is now getting monthly sales figures from the following groups: engine lathes, shapers, planer type milling machines, die heads, surface grinders, tool and cutter grinders, turret lathes and planers. He urged the groups to push forward with standardization of their tool-holding and work-holding elements and pointed to the accomplishment of the milling machine group in standardizing spindle ends. He said that the turret lathe and automatic lathe groups also are close to an agreement on standardization.

Mr. DuBrul also touched upon the association's cost work, the value of its monthly index of orders as a business barometer and the higher standing of the industry in the eyes of its customers, the latter development

being partially due to the two successful expositions held by the association. Mr. DuBrul said that users who saw the show at Cleveland this year were deeply impressed with it as a striking demonstration of the power of the association as an organized group. "We made them 'machine tool conscious,' as the advertising men express it."

Speaking on "Business Needs To Analyze Distribution Costs," W. B. Castenholz, Castenholz & Dittmar, certified public accountants, Chicago, declared that neither cost accountant nor general accountant has until recently given much thought to consolidation of expenditures for distribution of manufactured products. "Until such consolidation occurs, we will be unable to set much needed standards of performance and outlay in distribution activities. My plea is for the application of cost accounting principles to the manufacture of business as well as to the manufacture of goods. The monthly profit and loss statement of a manufacturer who has an adequate cost system will reflect a fairly true margin between sales and cost of sales, because only sales actually shipped each month are costed, but surely net profit or loss on present monthly profit and loss statements is entirely inaccurate, because distribution costs thereon bear positively no relation to specific shipments made."

Uniform Sales Contract Discussed

W. W. Tangeman, sales manager, Cincinnati Milling Machine Co., Cincinnati, submitted to the convention the preliminary report of the committee on uniform sales contract of which he is chairman. After pointing out some of the objections to a uniform sales contract, the committee agreed that "if member companies who sell direct and the representatives of those who sell through agents could agree to use a standard form with standard protective clauses for making all proposals, they could protect themselves against the few unscrupulous buyers as effectively as by contract, inasmuch as a proposal made in combination with a purchase order placed against it really is

a contract and is so interpreted."

The committee recommended that the printed proposal form which should accompany all quotations should cover such matters as delivery, terms of payment, shipment, estimated time of shipment, production estimates and cancellations, with amplifications where needed to cover the situation properly. The committee further stated that the form should be free from technical language, if possible, the meaning of the conditions should be clear and the conditions should not appear too formidable, but at the same time should give the protection required.

Exposition Committee Reports

J. Wallace Carrel, vice-president and general manager, Lodge & Shipley Machine Tool Co., Cincinnati, made the report of the committee in charge of the Cleveland exposition. Colonel L. S. Horner, president, Niles-Bement-Pond Co., New York, described the work that the committee in charge of the United States Census of Manufactures proposes to do. The financial condition of the association was set forth by August H. Tuechter, president, Cincinnati Bickford Tool Co., retiring treasurer.

Resolutions were adopted by the association paying tribute to the following members who died during the past year: Worcester R. Warner, founder of the Warner & Swasey Co., Cleveland; Henry W. Wendt, president, Buffalo Forge Co., Buffalo; and Joseph E. Hubinger, president, Eastern Machine Screw Corporation, New Haven, Conn. At the opening session the convention unanimously passed a resolution to send a cablegram of felicitations to Oscar Harmer, formerly of Alfred Herbert, Ltd., London, England, on his eightieth birthday.

General sessions, at which Mr. Buker presided, were held on the afternoon and evening of Oct. 21, and the morning and afternoon of Oct. 22. The members were especially gratified by the announcement at the last session that the board of directors had recognized the services of Mrs. F. F. Selbert by appointing her secretary of the association.

Republic Acquires Union Drawn Steel Co.

Formal Announcement of Purchase Made by E. T. McCleary, President of Youngstown Company

PRESIDENT E. T. MCCLEARY of the Republic Iron & Steel Co. Monday announced that terms have been arranged for acquisition of the Union Drawn Steel Co., Beaver Falls, Pa., the largest interest of its kind in the country. The purchase is subject to an appraisal and audit, to be conducted at once by the Republic company. The latter assumes immediate charge of the properties.

The Union Drawn Steel Co. has a net worth of \$14,000,000. Its capital structure consists entirely of common

stock, and it has no outstanding bonds. The company operates plants at Beaver Falls, Pa., Massillon, Ohio, Hartford, Conn., Gary, Ind., and Hamilton, Ont. It manufactures cold-drawn stock, and consumes annually about 250,000 tons of steel products. It is the largest buyer of merchant steel bars in the country.

It is the plan of Republic to continue Union Drawn as a subsidiary company, under the present management, headed by E. S. Hoopes, president.

Large Hydraulic Chucking Machine

Five-Spindle Self-Contained Automatic Features Convenience of Operation and Tooling

A SEVEN-INCH model M five-spindle hydraulic chucking machine for first and second operation work has been added to the line of the Cleveland Automatic Machine Co., Cleveland. The machine is entirely self-contained, and is provided with a hydraulic chucking mechanism that is simple and positive. Accessibility, permitting the work of tooling to be performed from the front of the machine, is also a feature.

Of barrel type, the tool turret follows the conventional design of the company's model A and M machines. It moves back and forth in wide bearings on the tool turret housing, and is kept in alignment by a large key in the housing. Double clamping bushings, one on each side of the turret holes, assure positive grip on the

piston type; when the maximum pressure is reached delivery of oil is reduced automatically. The low-pressure pump provides the back pressure on the high-pressure pump, and also serves to operate the stroke control lever, which regulates the delivery of the pump from 20 to 550 cu. in. per min. The pressure regulator, which can be adjusted while the machine is in operation, permits varying the pressure from 0 to 1000 lb. per sq. in. A control valve built into the body of the unit serves to control the action of the pump.

A single automatic valve, located at the rear of the spindle turret and between the work spindles, is connected directly to individual oil cylinders, one on each spindle, and controls the opening and the closing of

on the end of the driveshafts and may be changed conveniently.

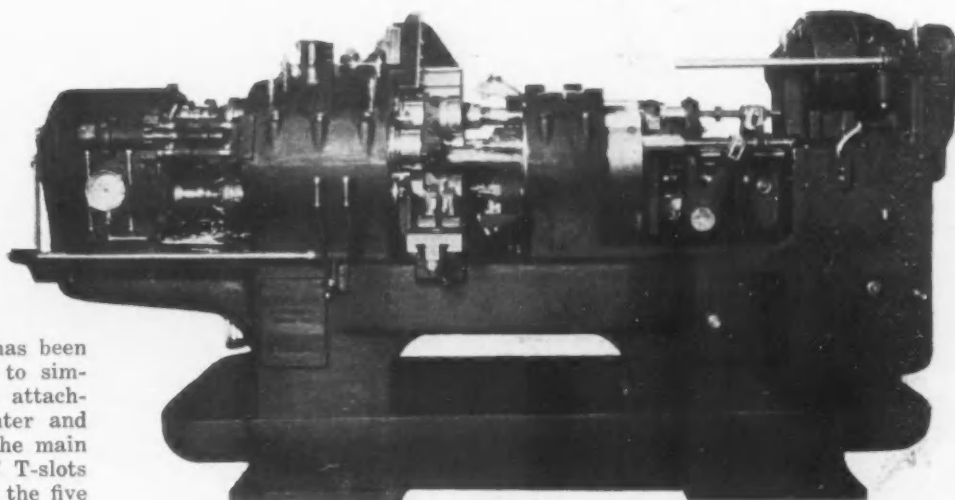
Bed and Housings Cast Integral

The main bed casting, with spindle and tool turret housings are cast integral to assure rigidity and maintain permanent alinement between the work spindles and turret tools. The pan and oil reservoir are also in one piece, and ample space is provided for chips.

There are two camshafts; the upper camshaft carries the wormwheel and drum for accelerated spindles, tool turret and cross-slide drums, while the lower camshaft carries the indexing and wedge operating cams, spindle brake and chucking control cams. The wormwheel, mounted on the extreme end of the upper shaft, has T-slots in its outer face, and carries the adjustable feed trip pins for shifting from slow, or working feed, to the high or indexing movement.

Three forming slides are provided. The two lower slides, front and rear,

THE Hydraulic Chucking Mechanism Is Adjustable for Heavy and Light Gripping, to Suit the Nature of the Work. All tooling may be done from the front of the machine



tools. An extra attachment has been provided for the tool turret to simplify tool combinations; this attachment is mounted in the center and extends beyond the face of the main tool turret, with a series of T-slots that extend lengthwise along the five sides.

Tooling sequence provides for standard tools in the No. 1 and 2 positions that advance with the turret at the same feed. In the No. 3 and 4 positions, upper and rear top, the tools are clamped in independent revolving spindles, moving longitudinally in the tool turret but individually controlled by levers actuated from a drum and cams mounted on the upper camshaft. The loading station, at the upper front or fifth position, is also independently controlled but does not revolve. Spindles No. 3, 4 and 5 can be cammed to complete their operation ahead of, or at the same time, as the other cutting tools. Threading, tapping or extra revolving spindles can be arranged.

Hydraulic Chucking Unit

The hydraulic unit consists of a high-pressure variable-delivery pump, a low-pressure gear pump, a stroke control lever, a pressure changing mechanism and a built-in control valve. These parts are mounted as a unit in the oil reservoir located at the right-hand rear of the machine. The drive is by silent chain from the feed bracket.

The high-pressure pump is of five-

the chucks. This five-way valve is designed so that pressure is maintained on four cylinders while the fifth cylinder is operated for opening and closing the chuck. Either hand or automatic operation of the oil cylinders is provided for.

Work spindles are made of alloy-steel forgings and are mounted in Timken roller bearings, two at each end. The spindles are driven by hardened alloy-steel gears from the main driveshaft, which passes through the center of the tool and spindle turrets to the main drive bracket at the right-hand end of the machine and is covered by a steel sleeve. The indexing cam is located on the lower camshaft.

The stop spindle mechanism is entirely automatic and is controlled from an independent oil cylinder mounted between the spindle turret and the hydraulic unit. It is operated by an independent oil line connected to the low-pressure pump, engaging and disengaging the spindle drive clutch, and at the same time applying the spindle brake mechanism to stop the spindle rotation. Spindle change gears provide for 20 speeds, ranging from 61 to 756 r.p.m. The gears are mounted

operate independently of each other. They are controlled by cams on the periphery of the operating drums, and are accelerated by bell cranks, and are connected directly to the slides. A double top-slide, mounted on the spindle turret cap, provides two forming stations in the third and fourth positions. Movement of this slide is from a cam box. Tool feed is independent of the high-speed indexing movement, and is controlled by trip pins carried in T-slots in the face of the worm wheel that can be adjusted to suit the length of cut. The pins engage a pawl on the trip lever, shifting the clutch from high to low, or vice versa.

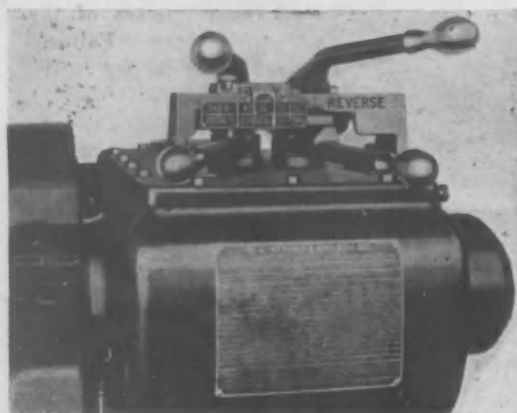
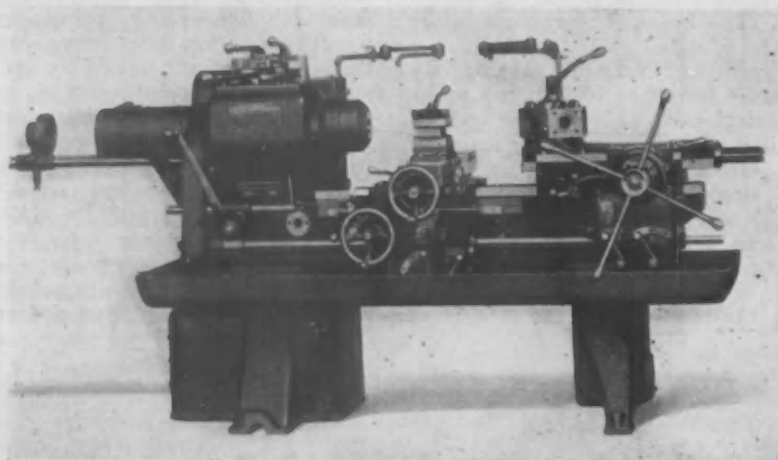
General Electric Co. sales billed during the first nine months of 1929, announced by Gerard Swope, president, amounted to \$301,812,808, compared with \$242,676,762 for the corresponding period last year, an increase of 24 per cent. Profit available for dividends on common stock for the first nine months of 1929 was \$47,965,831, compared with \$36,910,649 for the corresponding nine months last year.

Adds New No. 5 Universal to Turret Lathe Line

A NEW No. 5 universal with a 12-speed all-gear head has been added to the line of ram-type turret lathes manufactured by the Warner & Swasey Co., Cleveland. The machine has bar capacity of 2 in. round stock, and 13 in. effective turning movement of the turret slide for any one setting of the saddle along the bed. The maximum swing over the

end of the bed, or fastened to vertical plate at the rear of the headstock.

The universal cross-slide carriage has six power longitudinal and cross feeds. All feeds are contained in the apron and can be reversed. There are four cutter positions on the square turret and one on the rear tool post. The square turret can be quickly indexed and clamped by a quarter turn



THE New Hexagon Turret Unit Incorporates Features That Prolong Its Accurate Life. Head and bed are cast in one piece, and head walls are of box construction, eliminating the split at center line of spindle bearings. Direct-reading speed indicator may be seen in close-up view at left

bed is 19 in. and over-the cross-slide, 9 1/4 in.

The head and bed are cast in one piece, this casting being of nickel semi-steel. The head walls are of box construction eliminating the split at the center line of the spindle bearings, which are set in solid metal. In general design the head follows closely that of the company's heavier "A" type machines. The 12 spindle speeds range from 26 to 658 r.p.m., and are obtained through hardened alloy-steel gears sliding on hardened multiple-splined shafts. A patented speed indicator, shown in the close-up illustration, instantly shows the spindle speeds for the various position of the levers. The working spindle and head gear shafts are mounted on Timken roller bearings, and the entire head mechanism runs in a bath of oil.

Forward and reverse multiple-disk clutches are mounted on a high-speed driving shaft. The single pulley on this shaft is conveniently positioned for motor driving, either by a motor placed in a pedestal leg at the head

of the lever. Six independent adjustable stops carried on a stop roll are employed to throw out the longitudinal feed.

Lubrication of the cross slide unit has been concentrated at three points and made convenient for the operator. Two large reservoirs, one at each side of the apron, hold sufficient oil to supply all the apron bearings. At the third point a plunger pump, located at the front of the cross-slide, forces oil to the cross-feed screw, nut, and bearings, as well as to the dovetail slide and those portions of the bed ways under the cross carriage.

A new type of hexagon turret unit incorporates several features which tend to prolong its accurate life and add to its rigidity. First, the slide moves on hardened steel ways attached to the saddle; these hardened steel ways relieve the tendency of the saddle to "wear forward." Secondly, the top caps have been made heavy and are fitted with horizontal taper gibs to secure better adjustment for wear at the top surface of the slide.

Taper gibs placed at the sides of the slide also permit reestablishing the original alinement as wear occurs on the sides of the slide.

Six power feed changes are contained in an apron mounted at the front of the saddle and are independent of those in the cross-slide apron. Independent adjustable stops for each turret face may be set to throw out the feed at any point.

For bar work, the machine is furnished with an improved automatic chuck and bar feed. The operating lever actuates a pivoted yoke equipped with rollers which fit into the circular groove of the stepped wedge, the fingers being also equipped with rollers. This construction is intended to reduce substantially the effort required to operate the chuck. Oil pan and pump are standard equipment. The oil pan has been made wide at the front to better protect the operator from cutting compound and chips. The oil pot is built into the foot end leg, the opening being in such a position that chips do not fall directly into the strainer. A taper attachment that can be fitted to the rear of the cross-slide carriage will cut tapers up to 3 in. per ft. in lengths of 8 in. The chasing attachment for the cross carriage, also furnished special, can be used to cut from 4 to 32 threads per in. The leader is clamped on the carriage feed rod and the follower nut is bolted to the chasing lever.

Efficiency of Machinists' Vises

Operating efficiencies of machinists' vises are discussed in research paper 91 of the United States Bureau of Standards. An investigation was undertaken to determine the relationship between the size of a vise and its efficient working in typical shop operations on material held in it. Sawing, bending and riveting of steel specimens were carried out under carefully standardized conditions. Twelve vises of the stationary-bottom type were used, having jaw lengths from 2 in. (9-lb. vise) to 9 in. (282-lb. vise).

Static tests, such as sawing, in which the movement of the tool is large compared with the movement of the vise, showed no appreciable difference in the efficiency with which the work was performed. Dynamic tests, on the other hand, including riveting and some of the bending on large specimens, showed that the weight or inertia of the vise has an appreciable effect on the efficiency of work done in it. This efficiency seemed to reach a maximum with 5 1/4-in., 102-lb. vise, which operated better than any of the lighter vises. From this size upward, however, there was little, if any, gain in efficiency.

By-Products Recoveries, Inc., New York, manufacturer of dust collectors, has opened a Chicago office at 608 South Dearborn Street. Frank Trott is in charge.

This Issue in Brief

Cuts production cost by simple, inexpensive material control system, adapted especially to needs of small plant. The "heart" of the system is a "supply and demand" sheet, which is essentially a perpetual inventory record showing material ordered, invoiced, stocked and sold.—Page 1153.

"Spoiled goods" report to management reduces scrap. Inspectors must make out a report, giving name of the department responsible and reason for scrapping.—Page 1155.

Continuous heat-treating process solves problem of making stainless tubing with uniform physical properties. Soft strips are formed on a drawbench, on which is fitted an electric tube furnace. The tubing passes through the furnace, where it is soaked for at least 2 min. before emerging into the air. It is then drawn through a water-cooled die.—Page 1159.

Hollow ingots are used for making seamless steel tubes. Ingot is cast with a collapsible core. They are then elongated in a special rolling mill.—Page 1160.

Fire hazard reduced by equipping dipping vat with hinged cover held open by a rope. In case of fire, the rope will burn through and let the cover drop on the tank.—Page 1163.

Low maintenance cost is obtained by laying out repair shop with the same forethought used in planning production departments. Electrical repair shop in big plant is designed to eliminate lost motion.—Page 1161.

C. M. Schwab says fundamentally sound condition is largely responsible for uniform prosperity.—Page 1166.

Chromium-plating failure "mysteries" are usually due to lack of experience. Each chromium-plating job presents its own problem. The expert can usually predict where trouble will occur.—Page 1164.

For high fatigue resistance, homogeneity of the metal should be striven for, as fatigue failure can not occur, it is believed, unless the stress on the entire piece is sufficient to start the fracture at some point where stresses are concentrated by a flaw.—Page 1169.

If the tungsten-carbide tip comes off the shank, too rigid welding is to blame. The carbide and the steel have different rates of heat expansion. Copper brazing affords a soft cushion to absorb the stresses.—Page 1173.

Rate cutting may prove expensive. Bad psychological effects may nullify the money saving, for the ardor of the worker may be dampened, and the fear engendered that the rate may be cut again.—Page 1175.

Group bonus has real dangers. "It represents a deliberate shifting of the responsibilities of management to the employees," says Taylor Society head. It may easily result in the gang boss driving the group or individual members driving out weaker members.—Page 1175.

Wage incentive plan investigation reveals little uniformity. Thirty-six different plans are in operation. Many plants in the same industry use different plans. 40 per cent of employees are still working on time rates.—Page 1180.

Where scrap comes from, where it goes and how it gets there will be known when \$50,000 survey is completed. Scrap Institute will unearth working facts concerning the growing scrap industry.—Page 1177.

"If you take business that belongs to somebody else, somebody else is going to take business that belongs to you," says James A. Farrell. Good business at a fair profit will be maintained if sellers curb their cupidity.—Page 1167.

Faulty design or surface corrosion is responsible for fatigue failure in three-quarters of the cases, says authority. Failures due to poor materials are in the minority.—Page 1170.

In grinding tungsten carbide, pressure on the wheel should be light, and grinding should be away from the cutting edge, to avoid chipping.—Page 1173.

"Fussiness" in attempting to value inventory down to the last penny is both foolish and wasteful. Why bother to determine within a few cents the worth of a lot of material costing only a few dollars, when it is a matter of judgment whether a machine costing \$1000 shall be depreciated \$50, \$100 or \$150?—Page 1156.

Export business shrinks. September machinery exports, valued at close to 47 million dollars, were more than 6 per cent under August, but 40 per cent over September, 1928. Total iron and steel tonnage shipped out of country in September was 9 per cent under August, but the loss was all in scrap. Rolled and finished steel gained.—Page 1215.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Long Late Reckoning

THREE crashes in stock market prices in five days, each marked by an outpouring of securities on a scale almost beyond belief, make the reckoning for the bull movement of 1929 fairly staggering. Repeatedly in the past year it has been pointed out that the bidding up of stock prices to a basis of 1 or 2 per cent yield and the paying of 8 per cent on debit balances were conditions that could not continue for long. Yet so many counsels of experience had been cast aside, with apparent success, by the new-era prophets and so many predictions of disaster had been belied as new heights were reached, that the belief in an indefinite continuance of the bull market seemed to grow by the very illusion on which it fed.

In the confusion and semi-panic of a week so unparalleled in Wall Street history, no adequate appraisal is possible of the precipitating causes and of the extent to which business will suffer in the months ahead. Faith in a new era, in which business had been freed from major fluctuations and the fruits of increasing efficiency would pile up in dividends, was undisturbed so long as industry continued at a peak rate and corporate earnings showed an uninterrupted rise. But when the foundations of this faith began to be shaken—in part by evidence of overproduction in the automobile industry, one that touches the lives of more people than any other—the boundless enthusiasm that supported the securities boom gave way to an equally exaggerated spirit of pessimism and of distrust of stock values.

Mob psychology, as the *Guaranty Survey* points out, was accentuated by the fact that securities were in the hands of many thousands of inexperienced speculators, who were impelled into buying and selling en masse without a clear understanding of the reasons for doing so.

If advances in securities prices overdiscounted the excellent operations of industry in the first eight months of the year, it is equally true that the wholesale dumping of stocks is out of keeping with the moderate slackening of business now evident. While there is no gainsaying that the motor car industry, and possibly a few smaller activities, such as radio manufacture and airplane building, overreached themselves and are in a corrective period, business as a whole has continued at a highly satisfactory level. Moreover, cash reserves of corporations are large, the Federal Reserve ratio is double the legal minimum and unemployment is negligible.

The most unfortunate side of such a Wall Street disaster is that liquidation in stocks tends to slow up business. Much of the purchasing of consumer goods that was based on real or computed profits in securi-

ties will stop, and in many cases those who bought commodities in view of paper profits now find themselves in debt. The buoyancy of the securities market over many months has heightened the optimistic spirit that has been so outstanding in industry. It would not be surprising if under the same influence, and the prevalent confidence in the stability of commodity prices, there should have been some relaxing of the long-maintained limitation of inventories. The rate of new buying by industry in the immediate future will be closely watched for the light it will throw on this important point.

New Eyes and New Ways

NOT long ago two wide-awake members of a manufacturing firm went through a large establishment devoted to making wire. Both were surprised to find that one of the supplementary processes was done by hand and required the labor of six men. Being of an inventive bent, the two visitors at once set to work to develop a machine for doing what the six laborers had been seen to do. Resulting from this, the operation is now performed much more rapidly than before, at a mere fraction of the outlay for labor, and in the last analysis with probably little higher overhead, because the capital cost of the machine is largely offset by the release of floor space for other work.

The case is one that has been paralleled many times in American industry. All too frequently men are so occupied with thoughts of routine or so little accustomed to observing carefully and practically that golden opportunities are missed, in part, through lack of concentration or failure to challenge the existing order.

However much the man in the plant may resent the implication that some one not deeply steeped in his own lore can help him in his work, the fact remains that the independent viewpoint has been often responsible for improved practice. This does not depreciate in any way the intensive study of their problems which all managers of plants constantly make; it does very definitely suggest the value of outside thinking. Many important economies have come through the application to an industry of methods originally developed in another, and perhaps on their face not relevant to the processes of industry number one.

THROUGH the efforts of the Institute of Iron and Steel Scrap, the better element of the scrap industry, at least, appears determined to bring about better trading conditions and better practices in the marketing of this commodity, which in various ways has troubled the steel industry for many years. The

scrap institute has been functioning a little more than a year, and too much must not be expected in so short a time. Human nature can not be changed over night, nor can practices which have grown up during a generation be wiped out by any magic formula. It is a wholesome sign that the scrap industry thinks well enough of its program of self-improvement to appropriate \$50,000 in addition to annual dues to undertake a rather ambitious program of research. This will take in a complete survey of the production, consumption and distribution of scrap. Some steel companies have already shown a disposition to forward the work of the institute. They have long wanted to see the buying and selling of scrap made more amenable to the standards that for the most part obtain in the market for the finished products of the steel mill.

Coal Trade Ills Not Cured

FIVE years have brought very little of the expected readjustment in the bituminous coal trade. A survey is appropriate, as reports have just been issued for 1928 on proportionate production of different sized mines and on production by districts. The convenient comparison is with 1923, the year after the great strike. The United States Coal Commission made an exhaustive report on conditions and what might be done to right the coal trade, but nothing was done by Congress and the information now available for 1928 shows that adjustment by economic laws has not gone far.

The two principal complaints were that we had "too many coal mines and too many miners" and that the United Mine Workers held the union fields up to altogether too high wages to permit competition with the non-union fields. There was a connection between the two complaints, as the excess of miners arose partly from the fact that the non-union fields had trained many men while in the union fields there was much idleness of union men who, accordingly, demanded high rates per ton to give them an annual income when they were idle about one-third of the time.

Some adjustment in the supply of miners has taken place, many union men having sought other employment. The Pittsburgh district has had a near-scarcity of miners in the last few months, although in the summer of 1927 it had the union miners idle and many new open-shop men working.

The expectation of some was that the overworking of coal properties would be corrected in time; that the large mines would thrive through economy while the small mines would die out. The report just issued, however, shows that there has been no more than a small readjustment of that sort. The percentage of the total output coming from mines producing over 100,000 tons a year has been as follows: 1913, 75.4 per cent; 1923, 70.4 per cent; 1926, 79.1 per cent; 1928, 80.1 per cent. That represents progress, but not a great deal, for five years, particularly when one considers that production decreased 11.1 per cent from 1923 to 1928, which in itself would make some small mines inactive. Mines producing 50,000 to 100,000 tons annually, really very small mines, decreased merely from 1176 in 1923 to 725 in 1928.

As to wage conditions, one finds that in general the

districts complaining about high wages have lost farther in proportionate production while the districts complained about have gained. The statement is not true in all particulars, but the general swing has been that way. Below are given sets of losses and gains respectively, for districts which produced almost exactly three-fourths of the total bituminous coal in both 1923 and 1928. The total decreased 11.1 per cent and allowance for that general change is made in computing the percentages.

Pittsburgh	-27	Belleville, Illinois.....	-31
Westmoreland-Ligonier..	-15	Southern Illinois.....	-13
Freeport	-31	—	—
Central Pennsylvania....	-18	Connellsville	+ 3
Pan Handle - Pittsburgh		Fairmont, W. Va.....	+18
No. 8	-31	Pocahontas, W. Va.....	+29
Pomeroy	-25	Other West Virginia....	+57
Indiana	-29	Western Kentucky.....	+68
Central Illinois.....	-31	Other Kentucky.....	+59

The United Mine Workers was largely but not wholly eliminated. It appears that there are industrial and economic conditions in the districts where it formerly thrived that keep coal mining wages far above those in the fields long non-union. In some of the formerly union fields the operators feel that they would be greatly aided by a readjustment of freight rates to a mileage basis. Long ago the railroads gave the so-called "Southern fields" low rates, on a mileage basis, in order to develop them.

Steel Demand and Automobiles

WHILE the steel industry is looking for a large total demand for its product next year, it is not entertaining any very definite expectations of the automobile industry in particular. For instance, Mr. Farrell remarked at the Institute meeting that there was probably not a fabricating shop in the country that was not booked four or five months ahead. The official statistics had already suggested such a condition; for the shops were comfortably booked at the beginning of last year, and the figures for orders and shipments in 21 months since then show an excess of more than 400,000 tons in the bookings. Lately there has been reassuring rail and freight car buying news.

Proposals involving new construction, with fabricated steel, are carefully considered and ordinarily such activity is fairly steady. Railroads aim to replace about the same amount of rails year by year and they maintain their rolling stock in much the same manner. When it comes to automobiles, however, that is a matter of popular taste if not whim. While a railroad may buy cars at a given time because it sees the shops need the business and will quote close figures, it is more likely to be the other way about with automobiles. Many men, particularly with wifely influence, are likely to buy when others are buying.

What we know definitely about automobiles is that production underwent a considerable increase in the second half of last year and had a great increase in the first half of this year. The first half of last year failed to make a new first-half record by 6 per cent, but the second half made a new second-half record by 4 per cent. Then the first half of this year made a new first-half record by 37 per cent.

On the other hand it has been impossible to develop, from the statistics of production over a period of many years, any definite cyclical behavior. Just a

few years ago there was a notion that every third year was particularly good, but there is no support for that, nor for an idea that the years merely alternate.

While the automobile industry nearly always makes sanguine predictions as to new business, it has also been stressing the fact of a large replacement market, and just at this time that argument undermines predictions of a specially large demand next year. Obviously if there is an unusually large number of replacements in one year the public has got that far ahead and will have correspondingly less occasion to replace in the following year. The accepted method of computing average life of cars, carried out in a diagram in the annual official presentation of the trade, shows average life at 7 years for cars scrapped through 1923, and 6¾ years for cars scrapped last year, involving very little difference. Replacements this year have evidently been very heavy. That does not prove that they will not be heavy next year but it raises a doubt.

It is too early to attempt to measure the effect of the stock market crash on automobile buying, but plainly it will be a factor, especially in the demand for higher priced cars.

The steel industry feels it is on safer ground in expecting a substantial continuance of general demand for steel than in counting upon anything very precise from the automobile trade.

Billion in Export Surplus

EXPORTS of merchandise from the United States in the first nine months of this year are reported by the Department of Commerce at 3849 millions of dollars, and imports at 3362 millions. This shows an export excess of 487 millions.

It happens, however, that monthly exports customarily average much heavier in October to December than in January to September. During the six years last completed the final quarters have furnished 29.6 per cent of the six years' total. On this basis the 12 months this year should furnish approximately 5450 millions in exports.

Monthly imports, on the other hand, run at about the same rate in the last three months as in the first nine months of the year, for the average for the past six years shows 25.2 per cent coming in in October-December. On this basis imports for 1929 would total 4500 millions, leaving a probable excess of exports of nearly \$1,000,000,000, of which one-half will have been accumulated in one-fourth of the year.

A LONG with a domestic demand which has kept American steel mills running through the summer at a rate unprecedented in that season, there has been a growth in exports of iron and steel which has made the total the highest since 1920. Rolled and finished steel and semi-finished steel together, in the first nine months of the year, have accounted for 1,804,000 tons of outgoing product, compared with 1,568,000 tons to Sept. 30 last year, a gain of 15 per cent. Figuring tonnage of rolled products at 74 per cent of the ingot output, production of the former

in the nine months has been about 32,200,000 tons. Hence, the exports have amounted to 5.6 per cent of production, a larger proportion than we have seen for some time.

Better Industrial Relations

SO much has been written of the admirable work of large corporations in the industrial relations field that the public does not realize how much some of the small companies have done. The National Industrial Conference Board, New York, in a recent survey shows that industrial relations activities have made excellent headway in smaller establishments.

Nearly as prevalent in small plants as in large ones, it appears, are the giving of bonuses for special accomplishments, profit sharing plans, group life insurance, vacations with pay, first aid and safety committees, recreational activities, employee education, and various plant conveniences. All of these can be administered without setting up special machinery and can be financed without too severe a drain upon company finances.

Company housing, lodging and home purchasing plans, however, are seldom found in small establishments, as their financial resources do not allow participation in such ventures. Because of the risk involved in operating mutual benefit societies, these organizations are found in relatively few small companies; on the other hand, many of the latter have gone into group insurance.

The survey gives convincing proof that wherever finances have permitted small plants have not hesitated to introduce activities beneficial to their employees, even though the cost per wage earner is much higher than in the large plant. Among the reasons the Industrial Conference Board gives for such work in small or medium-sized establishments are the competition with large plants for competent labor, the increased productive efficiency of a satisfied working force and the belief that it is the part of enlightened policy to keep in step with prevailing practice.

In part, at least, the rapid growth of cooperation in small plants is significant of a changed attitude of many employers toward their employees. In 1921 there was a great falling away from the unusual cultivation of employees through the elaborate personnel bureaus of the war period and some that flourished in the post-war boom of 1919-20. But there came later an appreciation that no policy could be more mistaken than that of treating the employer-employee relation as a fair weather one. The weight of evidence is plainly with the view that we have come into an era of better feeling between industrial workers and their employers.

Modern developments in the methods of microscopic investigation of metallurgical problems have consisted mainly in improvements leading to the use of high magnifications, improved methods of preparation of the surfaces, and a very much larger variety of etching reagents, which render possible discrimination between phases, which, formerly, could not be readily distinguished, according to Dr. Walter Rosenhain of the British National Physical Laboratory.

Patent Bills Reviewed by Engineering Board

At a meeting of the administrative board of the American Engineering Council, at the Hotel Mayflower, Washington, Oct. 24 and 25, more than 30 bills and resolutions pending before Congress were considered.

The board voted to oppose the Cramton Bill, which would allow only licensed attorneys to practice before the Patent Office. Members of the board charged that the bill was an attempt on the part of lawyers to restrict the proper activities of engineers and scientists in acting as technical advisors and in other non-legal capacities in connection with applications for patents.

It was decided to favor the bill if an amendment were added to the effect that the objectionable provisions "shall not apply to engineers, chemists or other scientific persons when performing scientific, technical or other non-legal service in connection with applications for patents."

The board voted to oppose the King Bill to provide compulsory licenses for unused patents, and to indorse a bill offered by Senator King to investigate procedure in the Patent Office and offer recommendations to remedy the conditions which are responsible for the more than 100,000 patents awaiting consideration.

The board approved the recommendation of the committee on research that a group of experts be appointed to cooperate with the Bureau of Aeronautics and the Department of Commerce in making a study of the problems involved in the designing of airports.

The resolution offered in the House by Representative McLeod that a commission be appointed to study the causes and remedies of business cycles and unemployment was approved with the recommendation that the proposed committee should be under the supervision of the Department of Commerce. Other measures approved included a resolution for the establishment of a commission to plan a National Museum of Engineering and Industry, and a bill creating a Safety Division in the Bureau of Labor Statistics.

The annual meeting of the council will be held in Washington on Jan. 9-11, 1930.

Testing Society to Hold 1931 Meeting in Chicago

For some time the American Society for Testing Materials has been considering the holding of its annual meeting somewhere in the Middle West. At a meeting of the executive committee on Oct. 8, on recommendation of the committee on annual meetings, a decision was reached to hold the 1931 meeting in Chicago, June 22 to 26. The 1930 meeting will be held, as usual, at Haddon Hall, Atlantic City, N. J., June 23 to 27.

A regional meeting of the society

will probably be held in March, next year, under the auspices of the Detroit members of the society. The Detroit district committee, of which Vice-President Frank O. Clements is chairman, has suggested this meeting partly for the purpose of extending knowledge and appreciation of the value and significance of the A.S.T.M. work among the automotive and related industries. For this reason a one-day meeting is planned which is to be devoted to a discussion of what the society has done and is organized to do for the automotive industry. A number of papers discussing the many activities of the society in the testing and specifying of materials used in the automotive industry will be pre-

sented at morning and afternoon sessions, followed by a dinner.

Consideration is also being given to the possibility of holding the spring group meeting of committees at Detroit for the three or four days immediately following the Detroit regional meeting.

Bar Iron Rate Unchanged

The bi-monthly examination of the books of companies subscribing to the wage agreement with the Amalgamated Association of Iron, Steel and Tin Workers discloses that the rate on bar iron for the next two months will be unchanged at 2c. a lb.

The Week in Business

Drift of Current Financial and Economic Opinion

THE "hidden" bear market rushed out of hiding, "selective" buying gave way to indiscriminate selling and "blue chip" stocks were dumped overboard with less favored issues in three days of record-breaking liquidation in Wall Street.

On Oct. 29, sales on the New York Stock Exchange were the largest in history, totaling 16,410,030 shares, and virtually wiping out all the price advances of the year. Only second to this volume was that of Oct. 25, when 12,894,600 shares changed hands, while the total for Oct. 28 took third rank, with 9,212,800 shares.

Mob Psychology at Work

Commenting on last Thursday's sharp break in values, Jules S. Bache, J. S. Bache & Co., New York, said it was "almost entirely due to the inordinate craze on the part of an indiscriminating public to buy whatever any one told them there was a profit in."

Mob psychology has always been a factor in the stock market, asserts the *Guaranty Survey*, New York, but the changed character of the investing public in recent years has greatly exaggerated psychological reactions.

"The philosophy that stocks may just as well be valued at 30 times earnings as at 10 has been for the time irreparably damaged," in the view of Alexander D. Noyes, New York *Times*.

Business Fundamentals Sound

Business is on a sound basis, although the stock market crash has sobered sentiment, according to the First National Bank of Boston. "Credit resources are

ample, with interest rates on the decline. The Federal Reserve system and the member banks are in a strong position. Corporations have large cash holdings. Industrial earnings for the first nine months were higher than in any previous corresponding period. The purchasing power of the general public continues on a high level, although the stock market break may lessen the demand for luxuries. Furthermore, inventories with the exception of a few lines are on a conservative basis, and the trend of commodity prices has been gradually downward."

The absence of commodity price inflation and swollen inventories, together with a high Federal Reserve ratio, are among the most important factors distinguishing the present situation from that of 1920, in the eyes of the Alexander Hamilton Institute. The Reserve ratio, at 74.5 per cent (Oct. 23), is nearly double the legal minimum, which it virtually reached in 1920.

Some Slowing Down of Trade Predicted

A growing realization that abundant credit is available for industrial or financial purposes and that business conditions are generally sound will limit further liquidation of the stock market, in the opinion of the Harvard Economic Service.

While agreeing that underlying conditions are good, the *Commercial and Financial Chronicle* points out that stock market profits led to extravagant spending and extravagant living. "All this will have to be changed and unquestionably will involve a considerable slowing down of trade."

Iron and Steel Markets

Steel Trade Calm After Stock Crash

Adverse Effects Not Overlooked But Compensating Factors
Are Seen—Fabricating Awards Large—Pittsburgh
Scrap Unchanged for Third Week

STOCK market liquidation has not materially disturbed sentiment in the iron and steel trade. Feeling secure in the knowledge that it has been free from inflation, in sharp contrast with the securities market, the industry shares the confidence of its leaders, Messrs. Schwab and Farrell, in the fundamentally sound condition of business.

Although aware that steel demand may be affected by Wall Street losses, particularly in requirements of manufacturers of consumer goods, the trade is not disposed to exaggerate that possibility. In the same calm spirit the situation is being carefully surveyed with an eye to favorable results that may ensue, with particular attention to the release of construction work of the type that has been held back by high money rates.

Heavy construction, which has been at a record rate throughout the year, had another good week in terms of fabricated steel awards, which totaled 55,500 tons, compared with 58,000 tons a week ago. Fabricating shops are booked for four to five months and, although the season is near when lettings normally decline, the list of pending projects has been augmented by inquiries for 43,000 tons.

Mill bookings in ship steel have been increased 25,000 tons by the award of two Matson Line vessels to the Fore River yards of the Bethlehem Steel Corporation. Atlantic Coast shipbuilding yards, according to James A. Farrell's recent address before the American Iron and Steel Institute, have enough work to occupy them for six months.

Rail orders for the week total 45,000 tons, of which 40,000 tons was placed by one large Western road. The railroad equipment market is featured by an inquiry from the Rock Island for 5000 cars, calling for 45,000 tons of steel, a purchase of 400 refrigerator cars by the Pacific Fruit Express and orders for 100 locomotives distributed by the Pennsylvania.

Steel specifications from railroad equipment builders are improving as a result of recent purchases by the carriers, and manufacturers of tillage machinery are making heavier drafts on the mills. A relatively uniform flow of steel orders is coming from a wide circle of miscellaneous buyers, although in a few lines, such as radio manufacture, curtailment is reported.

Some slight improvement over present steel shipments to the automobile industry is indicated for

November, but signs of a general stepping up in motor car production next month are still lacking.

Price developments in finished steel are unimportant, aside from a decline in plates to their customary position of parity with bars and structural shapes.

Heavy melting steel scrap for a third week is unchanged at Pittsburgh and old material markets generally are lethargic, although heavy melting grade has receded 25c. a ton at Chicago.

Steel ingot production seems to be reaching a point of equilibrium. The operations of both the United States Steel Corporation and the Bethlehem Steel Corporation are at 82 per cent of capacity. The output of independents chiefly dependent on the automobile industry has given further ground, this being notably true in the Valleys, where operations now range from 65 to 70 per cent. The general average for the Pittsburgh, Chicago and Birmingham districts is 80 per cent.

Among finishing mills, sheet plants have further reduced their output to an average of 60 per cent. On the other hand, rail mill schedules have been increased at both Pittsburgh and Chicago.

Pig iron buyers are not yet manifesting much interest in first quarter needs. More surplus steel company iron is finding its way into the market, although as yet it has not seriously disturbed prices. Shipments to automobile foundries remain light, but deliveries to other melters are fairly well sustained. The Ford Motor Co., which recently bought 17,000 tons of basic iron and 16,000 tons of high-silicon malleable, is in the market for 10,000 tons additional of the latter grade.

October sales of machine tools will exceed the September total by a comfortable margin.

Machinery exports in September, at \$46,984,546, were 6.2 per cent lower than in August. Iron and steel exports last month, at 222,408 tons, showed a decline of 8 per cent from August and 2½ per cent from September a year ago.

Our European reports indicate that foreign steel markets are quiet, with prices weakening.

THE IRON AGE composite price for finished steel has declined to 2.362c. a lb., a new low mark for the year, comparing with 2.369c. last week and a year ago. This is the first time in 1929 that the composite has been below its level on the same date in 1928. Pig iron is unchanged at \$18.38 a ton.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
No. 2 foundry, Philadelphia...	\$21.26	\$21.26	\$21.26	\$20.76-
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50
No. 2 Southern, Cin'tl.....	17.69	17.69	17.19	19.94
No. 2, Birmingham.....	14.50	14.50	14.50	16.25
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	19.50
Basic, del'd eastern Pa.....	19.75	19.75	19.75	19.75
Basic, Valley furnace.....	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh...	20.76	20.76	20.76	19.76
Malleable, Chicago*.....	20.00	20.00	20.00	19.50
Malleable, Valley.....	19.00	19.00	19.00	18.00
Gray forge, Pittsburgh.....	19.76	19.76	19.76	18.76
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	105.00

Rails, Billets, Etc., Per Gross Ton:	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	35.00	35.00	35.00	33.00
Sheet bars, Pittsburgh.....	35.00	35.00	35.00	33.00
Slabs, Pittsburgh.....	35.00	35.00	35.00	33.00
Forging billets, Pittsburgh...	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh.....	40.00	40.00	40.00	42.00
Skelp, grvd. steel, P'gh, lb...	1.85	1.85	1.85	1.90

Finished Steel,	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.90	1.90	1.90	1.95
Bars, Chicago.....	2.00	2.00	2.05	2.00
Bars, Cleveland.....	1.90	1.90	1.95	1.90
Bars, New York.....	2.24	2.24	2.24	2.29
Tank plates, Pittsburgh.....	1.90	1.95	1.95	1.90
Tank plates, Chicago.....	2.05	2.05	2.05	2.00
Tank plates, New York.....	2.22 1/2	2.22 1/2	2.22 1/2	2.22 1/2
Structural shapes, Pittsburgh..	1.90	1.90	1.90	1.90
Structural shapes, Chicago...	2.00	2.00	2.05	2.00
Structural shapes, New York...	2.14 1/2	2.14 1/2	2.19 1/2	2.19 1/2
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20
Hot-rolled strips, Pittsburgh..	1.90	1.90	1.90	1.90
Cold-rolled strips, Pittsburgh..	2.75	2.75	2.75	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.75	2.75	2.85	2.75
Sheets, black, No. 24, Chicago	2.95	2.95	2.95	2.85
dist. mill.....	3.50	3.50	3.50	3.50
Sheets, galv., No. 24, P'gh...	3.60	3.60	3.60	3.60
dist. mill.....	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, P'gh...	2.45	2.45	2.45	2.20
dist. mill.....	2.40	2.40	2.45	2.55
Wire nails, Pittsburgh.....	2.45	2.45	2.50	2.60
Wire nails, Chicago dist. mill	2.40	2.40	2.40	2.40
Plain wire, Pittsburgh.....	2.40	2.40	2.45	2.45
Plain wire, Chicago dist. mill.	3.05	3.05	3.10	3.20
Barbed wire, galv., P'gh.....	3.15	3.15	3.15	3.25
Barbed wire, galv., Chicago	\$5.35	\$5.35	\$5.35	\$5.25
Tin plate, 100 lb. box, P'gh...				

Old Material, Per Gross Ton:	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Heavy melting steel, P'gh....	\$17.25	\$17.25	\$17.75	\$17.75
Heavy melting steel, Phila...	15.50	15.50	16.00	16.00
Heavy melting steel, Ch'go...	14.00	14.25	14.50	14.50
Carwheels, Chicago.....	14.00	14.00	14.00	14.25
Carwheels, Philadelphia.....	16.50	16.50	16.50	16.50
No. 1 cast, Pittsburgh.....	15.50	15.50	15.50	15.50
No. 1 cast, Philadelphia.....	16.00	16.00	16.00	17.50
No. 1 cast, Ch'go (net ton)...	14.50	14.50	14.50	15.50
No. 1 RR wrot., Phila.....	16.00	16.00	16.00	15.50
No. 1 RR wrot., Ch'go (net)	14.00	14.00	14.00	12.75

Coke, Connellsville,	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Per Net Ton at Oven:				
Furnace coke, prompt.....	\$2.65	\$2.65	\$2.65	\$2.90
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,	Oct. 29, 1929	Oct. 22, 1929	Oct. 1, 1929	Oct. 30, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12 1/2	18.12 1/2	18.12 1/2	16.25
Electrolytic copper, refinery..	17.75	17.75	17.75	15.75
Tin (Straits), New York.....	40.75	41.37 1/2	44.25	49.25
Zinc, East St. Louis.....	6.60	6.70	6.80	6.25
Zinc, New York.....	6.95	7.05	7.15	6.60
Lead, St. Louis.....	6.55	6.70	6.70	6.32 1/2
Lead, New York.....	6.75	6.90	6.90	6.50
Antimony (Asiatic), N. Y. ..	8.75	8.75	8.50	10.50

Pittsburgh

Steel Industry Still Curtailing Operations—Ingot Output Averages Below 80 Per Cent

PITTSBURGH, Oct. 29.—The steel industry in this district is still in a process of curtailment. The serious break in the stock market has had a temporarily paralyzing effect on business, even though it would be difficult to distinguish any signs of basic disorder. October has been a bad month for most steel makers, and no mills have been able to avoid sharp declines in operations.

Ingot operations in the district average less than 80 per cent this week and in the Valleys the rate has dropped to about 70 per cent. Finishing mills are also running slower, with the most marked curtailment in the sheet departments. A 50 per cent rate is not uncommon with companies making high-finished and special sheets. However, stepping up of rail mills is improving the rate of one mill in the district, and structural and plate units are still on comparatively high schedules.

The automobile industry continues to occupy the attention of many sellers of steel, but it is not easy to see any general improvement in that direction. Specifications for November are already sufficient to promise a slight improvement over October in shipments. Other consuming industries continue to take material at a good rate. The railroads served by mills in this district have not been active buyers in the past week, but heavy ton-

nages placed earlier in the month aided mill order books materially at a time when they needed business rather badly.

In the face of the present unsatisfactory conditions, prices have been fairly well maintained, and, where definite reductions have come about, recent quotations seem to be fairly strong. Bars and shapes and finally plates are becoming established at 1.90c., Pittsburgh, but on all three

products 1.95c. is still asked on car-load lots, and some business is being taken at that figure. On wire and wire nails, which have declined most sharply, price levels established last week have been successfully tested on small lots. Sheet prices are fairly firm, weakness being reported only on galvanized material in sales to jobbers. Some large makers have definitely stopped allowing the \$2 differential to the jobbing trade on galvanized sheets, and 3.50c., Pittsburgh, is still representative of the market. Makers of strip steel are resisting the pressure of buyers for lower prices, and quotations on cold-finished steel bars do not seem to be in question.

The pig iron market is unusually quiet, but shipments are fairly good and prices are not definitely lower.

Scrap is also dull, but conditions are somewhat better than they were at the beginning of the month and prices are unchanged for the third week.

Pig Iron.—Recent sales of basic iron in this district have disturbed the market slightly, but investigation tends to confirm that the Valley furnace price is still quotable at \$18.50. A Verona, Pa., steel foundry is reported to have bought 2000 tons of

basic iron at a delivered price of \$19.76, which would amount to a slight concession on the part of local sellers. However, Valley furnaces did not share in this tonnage, and one seller definitely refused to meet that price. The Edgewater Steel Co., Oakmont, Pa., apparently has not yet bought iron, although the company has been reported in the market for two or three weeks. Sales of foundry iron are few and far between, and there is little or no inquiry. The same thing might be said of malleable and Bessemer, and lots of car loads or slightly more, which have recently been sold, have brought the full price of \$19, Valley, and \$19.50, local furnace. Shipments during October have been fairly good, but in nearly all cases have exceeded sales. This is causing furnaces to accumulate a larger yard surplus than they carried during the summer, but stocks are still comparatively low.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.00

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel.—Sales are practically at a standstill, although occasional spot tonnages are being bought from time to time by small users. On business of this kind the price on billets, slabs and sheet bars is holding at \$35, Pittsburgh or Youngstown, but it seems that the list of preferential customers who ordinarily buy at a slight advantage in price has been extended for this quarter. In some cases, customers who have been paying the full market price were never forced to pay \$35 for their steel when the market was advanced to this price last summer, and these buyers are still getting their old price. Forging billets are unchanged at \$40 a ton, and this price seems to be holding fairly well. Wire rods are

quiet at \$40, Pittsburgh or Cleveland.

Rails and Track Accessories.—Following a week of considerable activity, this market is now quieter. As most of the larger roads served by Pittsburgh mills have bought their rails and track accessories, market interest is again centered on the rate of specifications. The Baltimore & Ohio has not announced its 1930 requirements, and may come into the market in the near future. Operations are rather light, but rail mills are stepping up their schedules and will be at capacity within another month.

Bars, Shapes and Plates.—Plates and shapes are still finding a good demand, but bar business is not improving as much as had been expected. Cold-finishing mills are at a low rate, and, with their hot bar requirements considerably curtailed, one of the best outlets for merchant bars is seriously hindered. Business in reinforcing bars is also declining seasonally, and deliveries are now rather prompt. On plates and shapes deliveries average from two to three weeks, with a month required for some special rollings. Railroad car builders in this district are beginning to step up their requirements, although recent buying of cars will not increase their operations to any great extent for several weeks. Barge builders need business, but prospects are very good and most barge builders feel that new orders will be placed before present work is completed. Fabricating shops are well engaged, but large jobs in this territory are slow in coming out. Prices are still somewhat unsettled, but bars and shapes are holding at 1.90c., and the tendency toward shading prices is not so pronounced as it was a few weeks ago. Plate prices are still somewhat stronger than those on bars and shapes, but the 1.90c. figure is appearing more frequently.

Wire Products.—Nail prices are better established as a result of the recent reduction of \$1 a ton, and the \$2.40, Pittsburgh, quotation to large buyers is now being adhered to on new business. Some companies have contracts on their books at lower figures, but are determined to hold the price on new tonnage. Demand for manufacturers' wire is unfavorably influenced by lack of buying by automo-

bile companies, and jobbers are taking annealed wire only in small tonnages. The wire price is unchanged at 2.40c. to 2.50c., Pittsburgh, the higher figure applying on carload lots.

Tubular Products.—Pipe mills are still reasonably active, but backlogs are low, and, with current demand seemingly on the decrease, it is likely that further curtailment in operations will soon be necessary. During the month operating schedules have been stepped down as much as 10 points, principally in the butt-welding departments. The trade is still interested in the large line pipe projects which are being talked of and there is a possibility that the proposed line from the Texas fields into Chicago may be let early next month. If not, the project will likely be postponed until after the first of the year. Demand for seamless pipe is holding up better than for the welded products. Shipments of mechanical tubing have declined sharply during the month, but there are prospects of some improvement in November.

Sheets.—Sheet mills curtailed operations last week, and with the leading interest running at about 75 per cent of capacity, the average for the industry has fallen under 70 per cent. Mills making high finished and special sheets are most affected, and one company is only running one of its plants every other week. However, metal furniture sheets are moving steadily, with most consumers operating their plants at close to capacity. Automobile tonnage for late November shipment is coming to local mills and, as most of this is material which will go into new models, the prospects for resumed activity in Michigan plants is somewhat better. This is not a busy season for makers of electric refrigerators, but their requirements have held up better than in former years. Prices seem to be established at recent levels, but there is still occasional shading where large buyers are concerned. Black sheets are selling in the Detroit area at less than 2.75c., Pittsburgh, in some instances, but most of this material takes heavy extras and is hardly a price criterion for the market. Jobbers are able to buy galvanized sheets at 3.40c., Pittsburgh, but the 3.50c. quotation to the

THE IRON AGE Composite Prices

Finished Steel

Oct. 29, 1929, 2.362c. a Lb.

One week ago	2.369c.
One month ago	2.354c.
One year ago	2.369c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 6;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Oct. 29, 1929, \$18.38 a Gross Ton

One week ago	\$18.38
One month ago	18.29
One year ago	18.25
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	\$18.71, May 14;	\$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.00c. to 2.05c.
Del'd Philadelphia.....	2.22c. to 2.27c.
Del'd New York.....	2.24c. to 2.29c.
Del'd Cleveland.....	1.90c.
F.o.b. Cleveland.....	1.90c.
F.o.b. Lackawanna.....	2.00c. to 2.05c.
F.o.b. Birmingham.....	2.10c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.05c.
F.o.b. Pittsburgh mills, cut lengths.....	2.30c.
F.o.b. Birmingham, mill lengths.....	2.10c.

Rail Steel

F.o.b. mills, east of Chicago dist.....	1.85c. to 1.90c.
F.o.b. Chicago Heights mill.....	1.95c.
Del'd Philadelphia.....	2.27c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.05c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.05c.
F.o.b. Birmingham.....	2.10c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	2.15c.
F.o.b. Coatesville.....	2.05c.
F.o.b. Sparrows Point.....	2.05c.
F.o.b. Lackawanna.....	2.05c.
Del'd New York.....	2.22 1/2c.
C.i.f. Pacific ports.....	2.35c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.00c. to 2.05c.
F.o.b. Birmingham.....	2.10c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Bethlehem.....	2.05c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	2.19c. to 2.06c.
Del'd New York.....	2.14 1/2c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

Base per Lb.

6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

Base per Lb.

Bars, f.o.b. Pittsburgh mill.....	2.30c.
Bars, f.o.b. Chicago.....	2.30c.
Bars, Cleveland.....	2.30c.
Bars, Buffalo.....	2.30c.
Shafting, ground, f.o.b. mill.....	2.65c. to 3.60c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

Wire nails.....	Base per Keg
Galvanized nails.....	\$2.40 to \$2.50
Galvanized staples.....	4.40 to 4.50
Polished staples (per lb.).....	3.10 to 3.20
Cement coated nails.....	2.85c. to 2.95c.
	Base per 100 Lb.

Bright plain wire, No. 6 to No. 9 gage.....	\$2.40 to \$2.50
Annealed fence wire.....	2.55 to 2.65
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	3.00 to 3.10
Barbed wire, galv'd.....	3.05c. to 3.15c.
Barbed wire, painted.....	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers).....	65.00

Cut Nails

Per 100 Lb.

Carloads, Wheeling, Reading or Northumberland, Pa.....	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.
No. 10, blue annealed, del'd Phila.....	2.42c. to 2.52c.
No. 10, blue annealed, B'ham.....	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh.....	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.57c. to 2.67c.
No. 13, blue annealed, B'ham.....	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.95c.
No. 24, del'd Philadelphia.....	3.07c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh.....	4.10c.
--------------------------	--------

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c. to 3.70c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.00c.
--------------------------------	--------

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c. to 4.10c.
---	------------------

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
--------------------------------	--------

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20	25-lb. coating I.C. \$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.	Alloy Differential
S.A.E. Series	
2000 (1 1/2% Nickel).....	\$0.25
2100 (1 1/4% Nickel).....	0.55
2300 (3 1/2% Nickel).....	1.50
2500 (5% Nickel).....	2.25
3100 Nickel Chromium.....	0.55
3200 Nickel Chromium.....	1.35
3300 Nickel Chromium.....	3.30
3400 Nickel Chromium.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35
5100 Chromium Steel (0.90 to 1.10 Chromium).....	0.45
5100 Chromium Spring Steel.....	0.20
6100 Chromium Vanadium Steel.....	1.20
6100 Chromium Vanadium Spring Steel.....	0.95
9250 Silicon Manganese Spring Steel (flat).....	0.25
Rounds and squares.....	0.50
Chromium Nickel Vanadium.....	1.50
Carbon Vanadium.....	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is 1/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 3/4 in. and larger.....	\$2.80
Spikes, 1/2 in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	.70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Black	Galv.	Inches	Iron	Black	Galv.
1/2.....	45	19 1/2		1/2 and 3/4.....	+11	+36	
3/4.....	51	25 1/2		3/4.....	23	5	
1.....	56	42 1/2		1.....	23	11	
1 1/4.....	60	48 1/2		1 and 1 1/4.....	31	15	
1 to 3.....	62	50 1/2		1 1/2 and 2.....	35	18	

Lap Weld

2.....	55	43 1/2		2.....	23	9	
2 1/2 to 6.....	59	47 1/2		2 1/2 to 3 1/2.....	23	13	
7 and 8.....	58	43 1/2		4 to 6.....	30	17	
9 and 10.....	54	42 1/2		7 and 8.....	29	16	
11 and 12.....	53	40 1/2		9 to 12.....	26	11	

Butt Weld, extra strong, plain ends

1/2.....	41	24 1/2		1/2 and 3/4.....	+13	+48	
3/4 to 1.....	47	30 1/2		3/4.....	23	7	
1.....	53	42 1/2		1.....	23	12	
1 1/4.....	58	47 1/2		1 to 2.....	34	18	
1 to 1 1/4.....	60	49 1/2					
2 to 3.....	61	50 1/2					

Lap Weld, extra strong, plain ends

2.....	53	42 1/2		1/2.....	29	13	
2 1/2 to 4.....	57	46 1/2		2 1/2 to 4.....	34	20	
4 1/2 to 6.....	56	45 1/2		4 1/2 to 6.....	33	19	
7 to 8.....	52	39 1/2		7 and 8.....	31	17	
9 and 10.....	45	32 1/2		9 to 12.....	21	8	
11 and 12.....	44	31 1/2					

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5% and 2 1/2%, and on galvanized by 1 1/2 points, with supplementary discounts of 5% and 2 1/2%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2 1/2 in.....	38
2 1/2 in.—2 3/4 in.....	46
3 in.....	52
3 1/2 in.—3 3/4 in.....	54
4 in.....	57
4 1/2 in. to 6 in.....	46
1 1/2 in.....	1
1 3/4 in.....	8
2 in.—2 1/4 in.....	13
2 1/4 in.—2 3/4 in.....	16
3 in.....	17
3 1/4 in. to 3 3/4 in.....	15
4 in.....	20
4 1/2 in.....	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	61	3 in.....	46
1 1/4 to 1 1/2 in.....	53	3 1/4 to 3 3/4 in.....	43
1 3/4 in.....	37	4 in.....	51
2 to 2 1/4 in.....	32	4 1/2, 5 and 6 in.....	40
2 1/4 to 2 1/2 in.....	40		

Hot Rolled

2 and 2 1/4 in.....	38	3 1/4 to 3 3/4 in.....	54
2 1/2 and 2 3/4 in.....	46	4 in.....	57
3 in.....	52	4 1/2, 5 and 6 in.....	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40% base.....	50
Plus differentials for lengths over 15 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

manufacturing trade is holding. Large makers of blue annealed sheets have not recognized reported price shading on this product and are still quoting 2.35c., Pittsburgh, for the No. 13 gage and 2.20c. for the No. 10. Wide strip competition continues to be troublesome, but sheets rolled on the continuous mills cannot always be substituted for the jobbing mill product, and on this business the prices mentioned above are holding.

Tin Plate.—Conditions have not changed materially in the last week, but the leading interest has curtailed its operations rather sharply, and the average for the industry is now not above 60 per cent. Further slowing down is not expected, as most companies will begin to roll 1930 tonnage some time next month.

Strip Steel.—Sentiment in the strip industry is slightly better, but business has failed to show any marked improvement. A few makers of automobile parts and accessories have increased their specifications, but the automobile industry as a whole is not yet coming back to the extent which was expected earlier in the month. Other large users of strip steel are still taking normally heavy shipments, although one exception is the radio industry, which is ordinarily a fairly large consumer. Hardware makers are busy. Strip mills are operating between 50 and 60 per cent of capacity. The price situation continues fairly satisfactory. Shading on both hot and cold-rolled material is reported occasionally, but makers usually have difficulty in checking up on irregularities. Not many attractive tonnages are coming out on which price concessions might be expected and lower quotations on small tonnages would force the smaller independent makers of strip to operate at a loss. Hot-rolled

strip is unchanged at 1.90c. to 2c., Pittsburgh, and cold-rolled at 2.75c.

Coal and Coke.—The coke market continues to show some improvement, but prices have not advanced and the furnace grade is still quotable at \$2.65 to \$2.75, Connellsville. An increasing volume at the higher figure is reported. The H. C. Frick Coke Co. is now operating less than 100 ovens in the Connellsville region, having put out about 3000 in the last month or six weeks. Demand for domestic coke is not so strong as it was a week or two ago, but is expected to improve with colder weather. Foundry coke is not active, but shipments are keeping up fairly well and prices have developed no further weakness.

Old Material.—The scrap market is exceedingly quiet and, although sentiment is not particularly good, prices are not quotably lower on the principal grades. No sales of heavy melting steel to mills have been reported, and dealers are sometimes paying as much as \$17 to cover old contracts. Carload lots are occasionally picked up at lower prices. Hydraulic compressed sheets are nominally unchanged, although a bid of \$17 at a Michigan automobile plant last week failed to take the tonnage offered. Occasional small sales to mills are reported. The light grades are very quiet, and the rather brisk market for short shoveling steel turnings, which existed during the summer, is now a thing of the past. Specialties are comparatively strong, as steel foundry operations are heavy and shipments are keeping up regularly. The same can hardly be said of shipments to steel plants, as operations are not improving and hold-ups are still effective at least two points. The monthly scrap list of the Baltimore & Ohio Railroad contains 23,000 tons, including 5000 tons of heavy melting steel and 6000 tons of rails.

Prices per gross ton delivered consumers yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel	\$17.00 to \$17.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Compressed sheet steel	16.75 to 17.25
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
Sheet bar crops, ordinary	18.50 to 19.00
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	17.00 to 17.50
Hvy. steel axle turnings	16.00 to 16.50
Machine shop turnings	11.50 to 12.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	20.50 to 21.00
Railr. coil and leaf springs	20.50 to 21.00
Roller steel wheels	20.50 to 21.00
Low phos. billet and bloom ends	21.50 to 22.00
Low phos. mill plates	21.50 to 22.00
Low phos. light grades	20.50 to 21.50
Low phos. sheet bar crops	21.50 to 22.00
Heavy steel axle turnings	16.00 to 16.50

Electric Furnace Grades:

Low phos. punchings	19.50 to 20.50
Hvy. steel axle turnings	16.00 to 16.50

Blast Furnace Grades:

Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50

Rolling Mill Grades:

Steel car axles	21.50 to 22.00
-----------------	----------------

Cupola Grades:

No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	19.00 to 20.00

Reinforcing Steel

Awards of 5600 Tons and New Inquiries for 900 Tons

REINFORCING steel awards in the week totaled about 5600 tons, the largest job, 1300 tons for grade elimination work for the Long Island Railroad, going to the National Bridge Works. Only a few new projects, totaling about 900 tons, were reported. Awards follow:

BOSTON, 300 tons, hotel, to Northern Steel Co.
WILMINGTON, DEL., 100 tons for Homeopathic Hospital, to McClintic-Marshall Co.
CAMBRIDGE, MASS., 200 tons, Harvard University tunnels, to Concrete Steel Co.
EVERETT, MASS., 100 tons, Warren Foundry & Pipe Co. foundry, to Barker Steel Co.
LONG ISLAND RAILROAD, 1300 tons, grade crossing elimination work in Newark, N. J., to National Bridge Works.
NEWARK, N. J., 250 tons, building for National Biscuit Co., to White Construction Co.
BUFFALO, 103 tons, part of new City Hall job, to Buffalo Steel Co.
SOUTH BEND, 150 tons, I. & M. garage, to Concrete Engineering Co.
MUNDELEIN, ILL., 150 tons, seminary building, to an unnamed bidder.
CHICAGO, 900 tons, Wieboldt store and apartment building, to Concrete Steel Co.
CHICAGO, 400 tons, apartment building at Fifty-second and Blackstone Streets, to an unnamed bidder.
RACINE, WIS., 100 tons, apartment building, to Calumet Steel Co.
PORT ANGELES, WASH., 600 tons, pulp plant for Olympic Forest Products Co., to Pacific Coast Steel Co.
OLYMPIA, WASH., 101 tons, bridge over North River, to Pacific Coast Steel Co.
LOS ANGELES, 800 tons, office building, Wilshire and La Brea Avenues, to Blue Diamond Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CINCINNATI, 130 tons for new St. Williams' Congregational Church; bids are being received.
CHICAGO, 160 tons, Howard Trust & Savings Bank building.
CHICAGO, 100 tons, Swedish Engineers' Club building.
CHICAGO, 400 tons, footings for Lawson Memorial Y. M. C. A. building.
WHITTIER, CAL., 100 tons, mausoleum; bids being taken.
SEATTLE, 200 tons, Fourteenth Avenue South bridge; Puget Sound Bridge & Dredging Co., low bidder on general contract.
SEATTLE, 363 tons, approach to West Spokane Street bridge; general contract to General Construction Co.

Lumber for the bulkhead and dock on the Chelsea River being built for the projected cast iron pipe foundry of the Intercontinental Pipe & Mining Co. at Chelsea, Mass., is to be delivered next week. The dock and dredging in the river are expected to be completed by the end of November to permit the landing of barges with building material and equipment for the proposed foundry.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count	60 per cent off list
Machine bolts, 100 count	60 per cent off list
Carriage bolts, 100 count	60 per cent off list
Nuts, all styles, 100 count	60 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd base per 100 lb.	\$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms		Sheet Bars		Skelp	
	Per Gross Ton	(Open Hearth or Bessemer)	Per Gross Ton	(F.o.b. Pittsburgh or Youngstown)	Per Lb.
Re-rolling, 4-in. and under 10-in., Pittsburgh	\$35.00	Pittsburgh	\$35.00	Grooved	1.85c. to 1.90c.
Re-rolling, 4-in. and under 10-in., Youngstown	35.00	Youngstown	35.00	Universal	1.85c. to 1.90c.
Re-rolling, 4-in. and under 10-in., Cleveland	35.00	Cleveland	35.00	Sheared	1.85c. to 1.90c.
Re-rolling, 4-in. and under 10-in., Chicago	37.00	Slabs			
Forging quality, Pittsburgh	40.00	(8 in. x 2 in. and under 10 in. x 10 in.)	Per Gross Ton	Wire Rods	
		Pittsburgh	\$35.00	(Common soft, base)	Per Gross Ton
		Youngstown	35.00	Pittsburgh	\$40.00
		Cleveland	35.00	Cleveland	40.00
				Chicago	41.00

Prices of Raw Material

Ores		Ferromanganese		Fluxes and Refractories	
Lake Superior Ores, Delivered Lower Lake Ports				Fluorspar	
	Per Gross Ton		Per Gross Ton		Per Net Ton
Old range Bessemer, 51.50% iron	\$4.80	Domestic, 80%, seaboard	\$105.00	Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
Old range non-Bessemer, 51.50% iron	4.65	Foreign, 80%, Atlantic or Gulf port, duty paid	105.00	No. 2 lump, Illinois and Kentucky mines	20.00
Mesabi Bessemer, 51.50% iron	4.65	Spiegeleisen		Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.25 to \$18.75
Mesabi non-Bessemer, 51.50% iron	4.50		Per Gross Ton Furnace	Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	\$2.50
High phosphorus, 51.50% iron	4.40				
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit			Fire Clay Brick	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.				Per 1000 f.o.b. Works
Iron ore, low phos., Swedish, average 68% iron	12.00c.				High-Heat Intermediate Duty Brick Heavy Duty Brick
Iron ore, basic Swedish, average 65% iron	10.00c.			Pennsylvania	\$43.00 to \$46.00 \$35.00 to \$38.00
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.			Maryland	43.00 to 46.00 35.00 to 38.00
Manganese ore, Brazilian, African or Indian, basic 60%	30.00c.			New Jersey	50.00 to 65.00
Tungsten ore, high grade, per unit, in 60% concentrates	\$15.50 to \$16.50			Ohio	43.00 to 46.00 35.00 to 38.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00			Kentucky	43.00 to 46.00 35.00 to 38.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.			Missouri	43.00 to 46.00 35.00 to 38.00
				Illinois	43.00 to 46.00 35.00 to 38.00
				Ground fire clay, per ton	7.00
				Silica Brick	
					Per 1000 f.o.b. Works
				Pennsylvania	\$43.00
				Chicago	52.00
				Birmingham	50.00
				Silica clay, per ton	\$3.50 to 10.00
				Magnesite Brick	
					Per Net Ton
				Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
				Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
				Standard size	45.00
				Chrome Brick	
					Per Net Ton
				Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts		Bolts and Nuts		Small Rivets	
	Per 100 Pieces		Per Cent Off List		Per Cent Off List
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)					
†Machine bolts	70	Semi-finished hexagon nuts	70	F.o.b. Pittsburgh	70 and 10
†Carriage bolts	70	Semi-finished hexagon castellated nuts, S.A.E.	70	F.o.b. Cleveland	70 and 10
Lag bolts	70	Stove bolts in packages, P'gh.	75, 20, 10 and 5	F.o.b. Chicago	70 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads	70	Stove bolts in packages, Chicago	75, 20, 10 and 5	Cap and Set Screws	
Hot-pressed nuts, blank or tapped, square	70	Stove bolts in packages, Cleveland	75, 20, 10 and 5	(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Hot-pressed nuts, blank or tapped, hexagons	70	Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2 1/2		Per Cent Off List
C.p.c. and t. square or hex. nuts, blank or tapped	70	Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2 1/2	Milled cap screws	80, 10 and 5
Washers*	7.00c. to 6.75c. per lb. off list	Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2 1/2	Milled standard set screws, case hardened	80 and 5
		Tire bolts	60, 5 and 5	Milled headless set screws, cut thread	75 and 10
		Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.		Upset hex. head cap screws, U.S.S. thread	85
		Large Rivets		Upset hex. cap screws, S.A.E. thread	85
		(1/2-in. and larger)		Upset set screws	80, 10 and 5
			Base per 100 Lb.	Milled studs	70
			F.o.b. Pittsburgh or Cleveland		
			\$3.10		
			F.o.b. Chicago		
			\$2.20		

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/2 in. x 5 in. take 10 per cent lower list prices.

Chicago

Railroad Needs and More Liberal Orders from Farm Equipment Makers Help to Steady Steel Demands

CHICAGO, Oct. 29.—Railroad needs in rails and car equipment again feature the Western iron and steel market. Additional rail tonnages are in the making, and, in the meantime, releases against recent contracts have reached producers, who have stepped up rail production to 80 per cent of capacity. The Rock Island will make use of 45,000 tons of steel for the superstructures of 5000 freight cars, which will soon be purchased. The Missouri Pacific and other Southwestern railroads are named as probable buyers of new equipment.

New orders for finished steel are well balanced among the various products, and the total is little affected by new rail business. Releases against past obligations portray a steady inflow of specifications which assures continuance, for the time being, of operations at 80 per cent of ingot capacity. Sentiment in the local market leans toward a uniform demand for steel over the remainder of the year.

Increased use of car materials, heavier releases for rails and more liberal requisitions by farm implement manufacturers give promise of steadying demand at a time when inventory-taking threatens to curtail shipments. An encouraging feature of current business is the relatively uniform flow of orders from miscellaneous manufacturers, who individually are not large purchasers. Farm implement manufacturers are finding demand for tillage machinery well above expectations.

Pig Iron.—Melters of Northern foundry iron are coming into the market more freely, some making commitments for November, December and January shipment, while a few are placing orders for delivery over the first quarter of next year. The curve representing shipments by local sellers is tending upward. The charcoal iron market is spotty, with occasional tonnages being taken below \$24 a ton, furnace. Scattered lots of Southern iron are said to have been disposed of at \$13 to \$13.50 a ton, Birmingham. It is reported that some sellers are willing to consider first quarter tonnages at \$13.50 a ton, Birmingham. A Joliet melter will buy 1000 tons, part of which will be Southern and part Northern iron.

Prices per gross ton at Chicago:
N'th'n No. 2 fdy., sil. 1.75 to 2.25... \$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75... 20.50
Malleable, not over 2.25 sil. 20.00
High phosphorus 20.00
Lake Super. charcoal, sil. 1.50 27.04
So'th'n No. 2 fdy. (all rail) .. \$19.01 to 19.51
Low phos., sil. 1 to 2, copper free... 29.50
Silvery, sil. 8 per cent. \$28.79 to 29.79
Bess. ferrosilicon. 14-15 per cent... 46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—Hot mills in this district are operating at 85 per cent of capacity, and current specifications are ample to support this rate. New buying at present quotations is less active than a week ago, and order books are shrinking. Few orders are being entered beyond the immediate needs of consumers. Deliveries of blue annealed sheets range from three to four weeks, while other grades may be had promptly. Jobbers are finding a well sustained demand for all grades of sheets. Container manufacturers

are ordering freely, but the roofing trade has passed the peak of its fall production schedule and specifications from this source are tapering sharply.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—New contracts for cast iron pipe are measurably larger from widely scattered points in this district. The National Cast Iron Pipe Co. will furnish 44,000 ft. of 8-in., 2500 ft. of 6-in. and 6000 ft. of 4-in. for O'Fallon, Ill. James B. Clow & Sons will ship a tonnage of cast iron pipe to Grosse Isle, Mich., and the McWane Cast Iron Pipe Co. will furnish 18,000 ft. of 6-in., 500 ft. of 8-in., 5000 ft. of 4-in. and 3000 ft. of 2-in. pipe for Cedarville, Ohio. Among fresh inquiries are 300 tons of 6 and 12-in. pipe for Glenview, Ill., and 8600 ft. of 6 and 8-in. for Birmingham, Mich. Genoa, Neb., will open bids Nov. 8 on 9000 ft. of 8-in. pipe. The C. W. Rolling Co., Des Moines, Iowa, has been awarded a general contract to lay 5000 ft. of 6-in. pipe at Indianola, Iowa.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.70 to \$45.70; 4-in., \$47.70 to \$49.70; Class A and gas pipe, \$5 extra.

Plates.—The outlook for increasing demand for plate mill products is brighter than it has been in the last four or five weeks. The railroad equipment field continues strong and prospects for added business in the oil producing centers of the West are bright. The Rock Island has come into the market for 5000 cars, which will require about 45,000 tons of steel. The Burlington announced a week ago that it would buy 600 cars and build a like number in its own shops. It is now reported that the car program being undertaken by this railroad calls for 2200 cars, of which about half will be let out on contract and the remaining 1100 will be built in the railroad's shops. The Missouri Pacific, which early in the year placed large orders for cars, expects to enter the market again about Dec. 1, when it will take figures on cars that are specified in the 1930 budget. Inquiries are

out for 18 baggage and mail cars for the St. Louis-San Francisco and the Wabash. It is reported from St. Louis that inquiries for cars are being shaped by several Southwestern railroads. Greater interest in the conservation of oil and gas reserves gives promise that the petroleum industry will draw more heavily against steel mill commodities. Several odd-lot orders for tankage plates total 1500 tons for shipment to fabricators in the Southwest. Fresh inquiry from the same direction totals 7500 tons. It is interesting that current business of this kind is coming from widely scattered sources and in smaller individual lots than has been characteristic of oil producers' and refiners' needs in recent months. Manufacture of electrically welded pipe continues to take sizable tonnages of plates. Prices for plates remain steady at 2.05c. a lb., Chicago. Deliveries range from three to four weeks except when orders match rolling schedules.

Rails and Track Supplies.—After a delay of one week, releases against 1930 contracts for standard-section rails have reached mills and output has been advanced to 80 per cent of capacity. As to sales, this market is drifting quietly while sellers await inquiries which are expected from several Western railroads. Orders for track fastenings cover only needs for current maintenance programs. Demand for light rails is improving. The bulk of the tonnage placed is reported to have been taken by mills in Pennsylvania.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Ferroalloys.—This market is quiet. a carload of spiegeleisen, in the 19 to 21 per cent grade, has been sold at \$34 a ton, Hazard, Pa. Quotations on 50 per cent ferrosilicon are \$83.50 a ton for future and \$88.50 a ton for spot business.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$39.76 to \$41.76.

Bolts, Nuts and Rivets.—Releases for these commodities are larger from manufacturers of farm machinery, the railroads and car builders. After several months, in which producers have been balancing stocks, they now find that, at 60 to 65 per cent of capacity, shipments about match output. Total shipments in October are smaller than in the same month a year ago.

Reinforcing Bars.—Awards of reinforcing bars total above 1600 tons for the week. Fresh inquiry is not large and dealers are not entertaining high hopes as to the volume of business that will be closed this fall. Nevertheless, the thought is expressed by sellers that the strengthening of the bond market is a factor which can be expected to stimulate building programs and in turn increase demand for reinforcing bars. Sales for the first 10 months of 1929 are variously reported at 10 to 20

per cent below the corresponding period a year ago. Order books are a shade lighter than in October, 1928, and inquiries hold less promise than at this time a year ago. Lower levels of prices through most of this year have narrowed profits. Quotations remain mixed as competition waxes keen for tonnages that are active.

Cold-Rolled Strip.—Prices for this commodity are steady in a market which is unusually dull both in sales and releases against old commitments. Consumers have given no indications that their needs will be greater in the near future.

Wire Products.—Output of wire mill products ranges from 50 to 60 per cent of capacity in the various mills in this district. Demand from jobbers is holding steady, even in the Northwest, where winter weather is soon to be expected. Shipments of woven wire fencing are a shade larger to widely scattered parts of the country. The manufacturing trade as a whole specified a smaller aggregate tonnage of wire and wire products than it did in the previous week. The disposition of most consumers is to buy at close range. Stocks in the hands of users and jobbers are small, this evidently being a satisfactory situation in view of the prompt service being given by mills.

Old Material.—Specialties and heavy tonnage grades of scrap are tending to pull away from each other both in volume of demand and strength of prices. Consumers of the heavy tonnage grades are curtailing shipments at a time when supplies are expanding. Strict inspections by mills have forced dealers to pay close attention to the preparation of scrap and, by the same token, there is accumulating in this district a sizable tonnage of scrap steel which will not meet the rigid regulations imposed by consumers. Some large buyers give evidence of having accumulated satisfactory stocks. Dealers continue to press for sales and, meeting stiff resistance from consumers, are accepting prices that range from 25c. to 50c. a ton below quotations of a week ago.

Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel.....	1.90c. to 2.25c.
Reinforc'g bars, rail steel.....	2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (½ in. in Nos. 10 and 12	
gages)	3.20c.
Hoops (No. 14 gage and lighter) ..	3.75c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, ½ in. and larger.....	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank..	60
Hot-pressed nuts, hex., tap. or blank..	60
No. 8 black ann'l'd wire, per 100 lb..	\$3.45
Com. wire nails, base per keg.....	2.95
Cement c'd nails, base per keg.....	2.95

Several thousand tons of heavy melting steel has been taken by a mill at \$14.50 a gross ton, delivered. Hydraulic bundles have sold off 25c. The cast iron boring market is dull. Tonnages are accumulating at points of production and consumers show little interest even when offered this grade at \$10 a gross ton, delivered, which is 50c. a ton below the figure established on the last tonnage sale. The specialty market is active and prices are well supported by a substantial volume of quiet buying. Stocks in the hands of some users are of fair size, and shipments are being closely watched. Gray iron and malleable shops are taking more scrap, the latter finding an active demand for castings by railroad equipment manufacturers. Both inquiries and purchases of electric furnace low phosphorus grades are active.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$14.00 to \$14.50
Shoveling steel.....	14.00 to 14.50
Frogs, switches and guards, cut apart, and misc. rails	15.75 to 16.25
Hydral, compressed sheets	12.25 to 12.75
Drop forge flashings.....	10.75 to 11.25
No. 1 busheling	12.25 to 12.75
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.50 to 19.00
Railroad leaf springs cut apart	18.50 to 19.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.25 to 14.75
Low phos. punchings.....	16.50 to 17.00
Low phos. plates, 12 in. and under	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings	12.00 to 12.50
Cast iron borings.....	9.50 to 10.00
Short shoveling turnings..	9.50 to 10.00
Machine shop turnings....	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	16.75 to 17.25
Cupola Grades:	
Steel rails less than 3 ft..	17.50 to 18.50
Steel rails less than 2 ft..	19.50 to 20.00
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	26.00 to 26.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought....	13.50 to 14.00
No. 2 railroad wrought....	12.50 to 13.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast....	14.50 to 15.00
No. 1 railroad cast.....	14.00 to 14.50
No. 1 agricultural cast....	13.25 to 13.75
Stove plates.....	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	10.75 to 11.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Bars.—Both specifications and sales of mild steel bars have made good accounts of themselves in the last week. New business is coming from a wide circle of miscellaneous buyers. Manufacturers of tillage machinery are finding demand in excess of expecta-

tations and their tendencies are to expand operations. Prices for iron bars are quotable at 2c. to 2.05c., Chicago. Demand is steady from manufacturers of railroad equipment. Output of alloy steel bars ranges from 60 to 65 per cent of capacity. This commodity is rapidly gaining favor with manufacturers of farm implements, who are steadily taking larger quantities. For the first time in over a month, specifications for rail steel bars have fallen below shipments. New sales are dull, but on going business prices are holding at 1.95c., Chicago Heights.

Structural Material.—Greater activity in this market is indicated more by the volume of new work in architects' offices than by actual awards and new inquiries. Contracts for the week total 3400 tons, and fresh requests for prices aggregate 8600 tons. Specifications for structural materials are well ahead of the volume a week ago. The bulk of this material was ordered out by car builders. Prices obtained by fabricators still reflect a highly competitive market. Mills are asking 2c. to 2.05c., Chicago.

Mill prices on plain material, per lb.: 2.00c. to 2.05c. base, Chicago.

Detroit Scrap Unchanged

DETROIT, Oct. 29.—There have been no changes in prices on old material in this district.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov.	
steel	\$13.75 to \$14.25
Borings and short turnings	8.25 to 8.75
Long turnings	8.00 to 8.50
No. 1 machinery cast....	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydral. comp. sheets....	13.75 to 14.25
Stove plate	9.00 to 9.50
New No. 1 busheling....	11.75 to 12.25
Old No. 1 busheling.....	10.25 to 10.75
Sheet clippings	8.00 to 8.50
Flashings	12.25 to 12.75

Railroad Orders Car and Ship Unloaders

Hocking Valley Railroad Co. has awarded contracts to Wellman-Seaver-Morgan Co., Cleveland, for three 17-ton stiff-leg ship ore unloaders, and to Industrial Brownhoist Corporation, Cleveland, for two 120-ton lifting turning car dumpers, for installation at Presque Isle, Ohio.

The dumpers will be located on one side of a slip and will be capable of handling over 60 120-ton cars an hour, and the ship unloaders will be on other side of slip. Electric pusher locomotives will be installed on both coal and ore piers for handling empty and loaded cars. The ore and coal dock will provide a new channel for the flow of Great Lakes ore and West Virginia coal.

Three large substations will be installed for supplying power to the development. A contract for electrical equipment has been let to Westinghouse Electric & Mfg. Co., East Pittsburgh.

New York

Pig Iron Inquiry for First Quarter—Steel Buying Shows No Recovery—Structural Awards Large

NEW YORK, Oct. 29.—Pig iron sales for the week, at 9000 tons, compare favorably with recent totals, although one transaction—the purchase of 5000 tons by a Connecticut melter—accounted for more than half of the aggregate. The Thatcher Co., Newark, N. J., has not yet closed on its inquiry for 3000 tons. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 300 tons of No. 2X and No. 2 plain for first quarter, and another inquiry for that delivery calls for 1000 tons. Otherwise, interest in first quarter is confined mainly to tentative inquiries. Melt is holding up well and pressure for shipments of iron is unabated. The price situation shows some unsteadiness along the seaboard, where Buffalo, eastern Pennsylvania and Southern water-borne irons meet in competition.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75 to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.		
N. J.	20.78 to 21.28	
East. Pa. No. 2 fdy., sil.	1.75 to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75	20.39 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Cast Iron Pipe.—Northern foundries are endeavoring to maintain pressure pipe prices at \$32 to \$34 a ton, f.o.b. foundry, but occasional sales are still made at delivered prices figuring back to about \$31, f.o.b. foundry. The Sinclair Refining Co., New York, has awarded about 450 tons of pipe for a new refinery at Wellsville, N. Y., to the National Cast Iron Pipe Co. The Federal Water Service Corporation, New York, has closed on 200 tons of 24, 30 and 36-in. water pipe for Chester, Pa., and the West Virginia Pulp & Paper Co., New York, has bought 100 tons of 12 to 24-in. pipe and fittings for Piedmont, W. Va. Municipal buying is limited to lots of a carload or less and not much activity is expected until after election, when some of the usual purchasing for winter delivery is expected by sellers.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$34.60 to \$36.60; 4-in. and 5-in., \$37.60 to \$39.60; 3-in., \$44.60 to \$46.60. Class A and gas pipe \$1 extra.

Finished Steel.—Recovery in steel buying may be hampered by the effects of the startling break in security values. While business conditions remain fundamentally sound, the steel trade does not overlook the fact that buying of the substantial character necessary to support high steel works operations is based to a considerable degree on confidence, which may be shaken by the events of the past week. It is too early to say that stock mar-

ket happenings have had an effect on steel buying, but the situation is being watched closely. The past week has brought no improvement in the volume of steel bookings. Some local sales offices have done better in October than in September, but with others the total tonnage this month will fall below that of last month. Plate mills, which until recently have been well buttressed with orders, are now working almost hand-to-mouth. Building construction remains one of the outstandingly favorable factors, and it should be helped by the easier money conditions now prevailing, although the season is near at hand when lettings normally fall off. Awards of structural steel in the New York district, however, were high during the week at about 35,500 tons and almost 20,000 tons of new inquiry appeared. Of the awards, 13,200 tons was for subway construction, which also contributes 12,300 tons to prospective business. The Salmon Tower Building, Fifth Avenue and Forty-second Street, requiring 9300 tons, has been awarded. Both of the largest awards of the week, totaling 22,500 tons, went to the McClintic-Marshall Co. Two apartment buildings totaling upward of 11,000 tons have come into the market.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.39c.; plates, 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—The National Bridgeworks will supply 1300 tons of bars for grade crossing elimination work on the Long Island Railroad at Jamaica, N. Y. The volume of small jobs ranging from 25 to 75 tons has fallen off considerably. However, prices are firm and unchanged.

Warehouse Business.—Buying continues small, but prices are stable except for the tendency to grant concessions of \$1 to \$2 a ton on black and galvanized and as much as \$5 and \$6 a ton on blue annealed sheets. Demand for structural material is fair, but tonnages being sold from stock are beginning to decrease in size.

Coke.—Prices are unchanged in a quiet market. Standard furnace coke is quoted at \$2.75 a net ton, Connells-ville, and special brands of beehive coke are unchanged at \$4.85 a net ton, ovens. Beehive foundry grade is quoted at \$8.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is quoted at \$9 to \$9.40 a net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Stocks of scrap in consumers' yards are not believed to be large, but in most cases mills are confining their purchases to a few carloads at a time, or are pressing for delivery of scrap due them on old

contracts. Prices are substantially unchanged, with No. 1 heavy melting steel being bought at \$15 to \$15.50 a ton, delivered eastern Pennsylvania, and No. 2 steel at \$11.50 to \$13.50, de-

Warehouse Prices, f.o.b. New York

	Base per Lb.	Per Cent
Plates and structural shapes.....	3.30c.	Off List
Soft steel bars, small shapes.....	3.25c.	
Iron bars.....	3.24c.	
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—		
Rounds and hexagons.....	3.60c.	
Flats and squares.....	4.10c.	
Cold-roll, strip, soft and quarter		
hard.....	5.15c. to 5.40c.	
Hoops.....	4.25c.	
Bands.....	3.75c.	
Blue ann'd sheets (No. 10).....	3.50c. to 3.90c.	
Long terme sheets (No. 24).....	5.80c.	
Standard tool steel.....	12.00c.	
Wire, black annealed.....	4.50c.	
Wire, galv. annealed.....	5.15c.	
Tire steel, ½ x ¼ in. and larger.....	3.40c.	
Smooth finish, 1 to 2 ½ x ¼ in.		
and larger.....	3.75c.	
Open-hearth spring steel, bases,	4.50c. to 7.00c.	
Machine bolts, cut threads:		
¾ x 6 in. and smaller.....	.60	
1 x 30 in. and smaller.....	.50 to 50 and 10	
Carriage bolts, cut thread:		
¾ x 6 in. and smaller.....	.60	
¾ x 20 in. and smaller.....	.50 to 50 and 10	
Coach screws:		
¾ x 6 in. and smaller.....	.60	
1 x 6 in. and smaller.....	.50 to 50 and 10	
Boiler Tubes—		Per 100 Ft.
Lap welded, 2-in.....	\$17.33	
Seamless steel, 2-in.....	20.24	
Charcoal iron, 2-in.....	25.00	
Charcoal iron, 4-in.....	67.00	

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.....	46	29
¾-in. butt.....	51	37
1-3-in. butt.....	53	39
2 ½-6-in. lap.....	45	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
½-in. butt.....	5	+19
¾-in. butt.....	11	+9
1-1 ½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box....	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20.....	3.75c. to 3.80c.	
No. 22.....	3.90c. to 3.95c.	
No. 24.....	3.95c. to 4.00c.	
No. 26.....	4.05c. to 4.10c.	
No. 28*	4.20c. to 4.25c.	
No. 30.....	4.45c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14.....	4.20c. to 4.40c.
No. 16.....	4.15c. to 4.25c.
No. 18.....	4.20c. to 4.40c.
No. 20.....	4.30c. to 4.50c.
No. 22.....	4.40c. to 4.60c.
No. 24.....	4.65c. to 4.75c.
No. 26.....	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30.....	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

livered, depending upon the mill to which it is shipped.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.00 to \$12.35
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast	10.25 to 11.00
Stove plate (steel works)	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Cast borings (blast fur. or steel works)	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	18.00 to 18.50
Iron car axles	22.50 to 23.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.25
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	12.75 to 13.25
Stove plate (foundry)	8.25 to 8.50
Malleable cast (railroad)	13.50 to 14.00
Cast borings (chemical)	9.50 to 10.00
Prices per gross ton, deliv'd local foundries:	
No. 1 machry. cast	\$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	14.00
No. 2 cast (radiators, cast boilers, etc.)	13.50

Aluminum Cans Being Tried in Norway

An experiment with the object of replacing tin with aluminum in the canning of foods is being made in Norway, according to information from Norwegian sources transmitted to the Department of Commerce by Commercial Attaché Marquard H. Lund at Oslo. At present the experiment is limited to canned fish. Fifty thousand aluminum cans have been made up and used for canned fish balls and other fish products, part of which has been exported.

Against a price that is considerably higher than tin, mention is made of saving the expense of a printed label, as aluminum may be embossed because it does not rust.

A Norwegian aluminum company is supplying the aluminum for these experiments and is backing the project. Plans are being made for the installation of rolling equipment at the company's plant at Hoyanger for the special gage sheets required.

With sales already 20 per cent greater than in all of 1928, itself a record year, the Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio, expects 1929 to surpass 1928 by about 50 per cent. The heavy crane division and the welding department are both running considerable night forces.

Warehouse Prices, f.o.b. Cleveland

Base per Lb.	
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to 4 in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.65
No. 9 gal. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

Cleveland

Further Slowing Down in Mill Operations, Particularly in Sheets—No General Automotive Upturn in Sight

CLEVELAND, Oct. 29.—Demand for finished steel during the past week held up to about the recent volume except for sheets, which are unusually slow following a recent rather limited spurt of orders from the automotive industry. Manufacturing plants not affected by the slowing down of the automotive industry are keeping up their operations at a fair rate, but practically all their orders for steel are for small lots.

While the automotive industry has made some purchases of steel bars, strip and sheets for November requirements, the demand from that source continues to drag. There are as yet no indications of a general increase in production schedules by automobile manufacturers during November.

There has been some further slowing down of mill operations. Some of the sheet mills in this territory are operating at not over 25 per cent of capacity, although the average is probably around 50 per cent. Some of the hot-rolled strip mills are somewhat under 50 per cent. Local bar mills have not reduced operations materially.

There is very little of interest in the price situation. Steel bars have settled to the recently quoted minimum Cleveland base, and there is some pressure against the 1.95c., Pittsburgh base on structural shapes and plates.

Pig Iron.—Foundries, as a rule, are taking little interest in the market. Consumers in general have enough iron under contract for the remainder of the year and are not ready to buy for the first quarter. Sales fell off sharply the past week, during which Cleveland interests took orders for 10,000 tons of foundry and malleable iron, practically all in small lots. An upward trend in shipments has not materialized this month. While one producer will ship a little more iron than during September, shipping orders by other furnace interests will be about the same as last month. Consumers in manufacturing industries aside from the automotive industry are taking iron in about the usual quantities, but shipping orders from the automobile foundries continue light. There has been a slowing down recently by jobbing foundries in this territory. However, their operations are spotty, some being well filled with work and others having very little business. Prices show no change. Cleveland furnaces quote foundry and malleable iron at \$19, furnace, for local delivery, and at \$18.50 for outside shipment. A central Ohio foundry purchased 500 tons of foundry iron from a Valley producer during the week at \$18.50, indicating that that price is being well maintained in the Valley district. In Michigan, the range from \$19.50 to \$20, furnace, for foundry and malleable iron still exists.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$19.50
S'th'n fdy., sil.	1.75 to 2.25	\$20.50 to 21.00
Malleable		19.50
Ohio silvery, 8 per cent.		28.00
Basic Valley furnace		18.50
Stand. low phos., Valley	26.50 to 27.00	

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$4 from Jackson, Ohio; \$6 from Birmingham.

Strip Steel.—Little new business is coming out for either hot or cold-rolled strip, and specifications against

outstanding contracts continue light. Mills are operating from hand-to-mouth. There is not enough activity to arouse any particular interest in prices, and the market appears to be very well maintained at 1.90c., Pittsburgh, for wide strip and 2c. for narrow and 2.75c., Cleveland, for cold-rolled strip.

Semi-Finished Steel.—Specifications from some consumers are fair and others are greatly reduced. There is no new inquiry. Shipments are being made against contracts at \$35, Cleveland and Youngstown, for sheet bars, billets and slabs. A local mill continues to operate 11 of its 14 open-hearth furnaces. Wire rods are firm at \$40, Cleveland.

Bolts, Nuts and Rivets.—Orders for bolts and nuts are still rather light, principally because of the rather small amount of business that is coming from the automotive industry. The October volume will be about the same as during September. The industry is operating at about 60 per cent of capacity. Rivets are in moderate demand. Prices on both lines appear to be firmly maintained.

Bars, Plates and Shapes.—Structural shapes are in fairly good demand. Plates are quiet and steel bars continue to move very slowly. Orders generally are for small lots. While there is not much inquiry for steel in the building field, small fabricators are getting considerable work in small lots and their shops are well filled. Considerable structural work is in prospect, but is being held up, evidently because of the present financial situation. Steel bars are now generally quoted at 1.90c., Cleveland.

Sheets.—The volume of sheet business the past week was the lightest in several months. However, with the recent releases of auto body sheets, some of the mills have better order books than a few weeks ago. Black sheets are moving fairly well in small lots. The market appears well stabilized at the recent range of quotations, although no lots came out during the week of sufficient size to test prices. Blue annealed sheets show ir-

regularities, being affected by both strip mill and continuous sheet mill competition. Continuous mills quote blue annealed sheets at 2.10c. and 2.25c. for No. 10 and No. 13 gage respectively, although some buyers in the automotive industry have covered at \$2 a ton lower. Black sheets are firm at 2.75c., Pittsburgh, and galvanized at 3.50c.

Wire Products.—Mills have closed contracts with jobbers for nails for the remainder of the year at \$2.40 a keg, Cleveland. Retailers recently have been able to buy at as low as \$2.45, but an attempt is being made to stabilize prices to retailers at \$2.50. Demand, which has been very slow, shows a little improvement, and mills report a slightly firmer price tone. Wire is holding to 2.40c., Cleveland. Demand is slow.

Coke.—A Valley producer has advanced by-product coke prices 50c. a ton to \$5.25, furnace, for egg and to \$5 for nut size. However, the nut grade is still available at \$4.75. October prices have been reestablished for November on by-product foundry coke. These are \$8.25, Painesville, and \$6.50, Ashland. Prices on Connellsville foundry coke are unchanged. A slowing down in the foundry industry is reflected in a decline in coke specifications.

Old Material.—The market is almost at a standstill. A local consumer has suspended shipments on both steel-making and blast furnace scrap, and there is no new buying by the mills. Prices are weak but untested. While quotations are unchanged, they are regarded as nominal. Small lots of No. 1 busheling were purchased in Detroit by a Cleveland dealer at \$12.25 to \$12.50 for delivery to an Ohio mill.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.	\$14.75 to \$15.00
No. 2 heavy melting steel.	14.25 to 14.50
Compressed sheet steel.	14.75 to 15.25
Light bundled sheet	
stampings	12.00 to 12.50
Drop forge flashings.	13.00 to 13.25
Machine shop turnings.	10.00 to 10.50
Short shoveling turnings.	11.50 to 12.00
No. 1 railroad wrought.	13.50 to 14.00
No. 2 railroad wrought.	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings.	12.50 to 13.00

Acid Open-Hearth Grades:	
Low phos., forging crops.	17.75 to 18.00
Low phos., billet, bloom and slab crops.	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap.	18.00 to 18.50

Blast Furnace Grades:	
Cast iron borings	10.50 to 11.00
Mixed borings and short turnings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50

Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.50 to 19.50

Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Philadelphia

Plate and Shape Business Fair—Steel Buying Generally At Low Level—Pig Iron Quiet

PHILADELPHIA, Oct. 29.—Steel buying is limited to small orders for current requirements. Shape mills are well engaged with tonnage from fabricating shops, which are booking some good contracts despite the advanced season. Bars and sheets continue quiet, as a result of inactivity in the automotive field, and it is suggested that the recession in the stock market will be a factor in retarding recovery of the automobile business. Announcement that the plant of the Victor Talking Machine Co., Camden, N. J., is to be expanded to manufacture all radios for a new corporation, which includes the Victor Talking Machine Co., General Electric Co. and Westinghouse Electric & Mfg. Co., leads sheet sellers here to expect a considerable sales increase in this district of sheets and other material for radio building.

Pig Iron.—Prices are lacking in strength, but, with consumers of foundry iron buying only small lots, actual test of the market is lacking. The quotation of \$21, furnace, however, is occasionally shaded 50c. a ton, even on small lots. Although demand is light, especially from the larger companies such as soil and pressure pipe and radiator manufacturers, shipments on old contracts are reported by sellers to be going forward without requests for delay. Basic iron is inactive, but a consumer at Claymont, Del., is showing interest in prices and is expected to inquire for a tonnage soon. The Virginia producer of pig iron goes into blast today and has booked 16,000 tons of foundry iron for shipment to the Virginia cast iron pipe makers at \$17.75 a ton, furnace. On this basis, the furnace is preparing to compete for tonnage in the Cumberland Valley, to points in which it has a freight rate of \$3.63 a ton.

Prices per gross ton at Philadelphia:

East. Pa. No. 2.	1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X.	2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. IX.		22.26 to 22.76
Basic (del'd east. Pa.)		19.75 to 20.25
Gray forge		20.00 to 20.50
Malleable		21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)		22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)		23.50 to 24.00
Va. No. 2 plain.	1.75 to 2.25 sil.	24.04
Va. No. 2X.	2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Specifications on contracts are small and new business is usually for less than carload lots. The price on contracts and spot business is 1.90c. a lb., Pittsburgh, or 2.22c., delivered Philadelphia.

Reinforcing Bars.—New projects in reinforced concrete involve only small tonnages of bars. One hundred tons of bars for a building for the Homeopathic Hospital, Wilmington, Del., has been awarded to the McClintic-Marshall Co. Prices of reinforcing bars are unchanged, with distributors quoting 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, with no extra for cutting to length, for billet steel bars, and 1.85c. to 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.17c. to 2.27c., Philadelphia, for rail steel bars.

Plates.—Mills are maintaining fair operating rates and have some good business in prospect from shipbuilders and the railroads. The Pennsylvania Railroad, which placed 50 locomotives with the Baldwin Locomotive Works and 25 with the Lima Locomotive Works, is to build 25 in its Altoona shops, also 100 tenders. The price of plates is unchanged at 2.05c., Coatesville, or 2.15c., delivered Philadelphia.

Shapes.—Despite a steady flow of business from fabricating shops, which are well engaged on contracts, prices of shapes show no tendency to become firmer. Quotations are unchanged at 1.90c. to 1.95c. per lb., f.o.b. nearest mill to consumer, or 1.96c. to 2.01c., delivered Philadelphia, and these prices are occasionally shaded slightly.

Sheets.—Local consumers of sheets are operating on curtailed schedules, but in the case of automobile body builders, increased output is expected when the designs for new models of two leading makes of motor cars are received. A leading radio manufacturer in this district is still operating at only a small percentage of total capacity, but sheet sellers are looking forward to increased radio consumption with expansion next year of the Victor Talking Machine Co. plant in Camden, N. J. Sheet prices are unchanged at 2.75c., Pittsburgh, or 3.07c., Philadelphia, for black sheets, and

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished.	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats.	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅜-in. incl.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	2.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

3.50c., Pittsburgh, or 3.82c., Philadelphia, for galvanized sheets. Blue annealed sheets, No. 13 gage, are quoted at 2.35c., Pittsburgh, or 2.67c., delivered Philadelphia, and blue annealed plates, No. 10 gage, at 2.20c., Pittsburgh, or 2.52c., Philadelphia. On sales to automobile builders and other preferred buyers, or when competition is encountered from the product of the continuous mill, the blue annealed sheet price is usually shaded about \$2 a ton.

Imports.—In the week ended Oct. 26, a total of 1945 tons of pig iron arrived at this port from British India. Steel imports consisted of 51 tons of steel bars from France, 37 tons from Germany and 7 tons from Belgium, 44 tons of steel bands from France and 16 tons from Germany, 50 tons of structural shapes from Belgium, 10 tons from France and 7 tons from Germany, 8 tons of steel scrap from France and 2 tons from the United Kingdom.

Old Material.—All grades of scrap are quiet and prices are unchanged. Buyers of No. 1 heavy melting steel are pressing for shipments on old orders and claim to be able to buy in the present market at \$15.50 a ton, delivered. Heavy breakable cast, after receding to \$14.50 a ton, delivered, is slightly firmer, and consumers have been unable to buy at a lower price.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.50 to \$16.00
Scrap T rails	15.00 to 15.50
No. 2 heavy melting steel	12.50 to 14.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50 to 14.75
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Roller steel wheels	19.50 to 20.50
No. 1 blast furnace scrap	10.50 to 11.00
Wrought iron and soft steel pipes and tubes (new specific.)	14.50
Shafting	19.00 to 19.50
Steel axles	22.75 to 23.25
No. 1 forge fire	14.00
Cast iron carwheels	16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Hyman-Michaels Co., Peoples Gas Building, Chicago, has incorporated the Hyman-Michaels Tank Line, Inc., to be run in connection with the present railroad equipment, rail, scrap iron and steel business. The new company will lease on a rental basis class 11 tank cars of all sizes. Maintenance plants will be established at East Chicago, Indiana, St. Louis, and Fort Worth, Tex. Officers of the Hyman-Michaels Tank Line, Inc., are: Joseph Michaels, president; S. E. Purdy, vice-president; E. B. Michaels, secretary; T. E. Tennis, general manager, and J. P. Morrissey, traffic manager.

Manganese Ore from Montana

Manganese dioxide, which is used in making dry batteries, has since 1918 been obtained in the United States chiefly from the Philipsburg district in Montana. The district has also produced more or less manganese oxide ore suitable for use in steel making, and recently a small shipment of Philipsburg ore was used at Silver King, Idaho, in the Tainton process of zinc extraction. The process of beneficiating the dioxide ore has produced a large quantity of manganiferous tailings, which is valuable either for re-concentrating or for fluxing. It is now being used as a flux at the blast furnace of the Columbia Steel Corporation at Provo, Utah, in the manufacture of high-manganese pig iron.

Statistics compiled by the United States Geological Survey, supplemented by figures from the Bureau of Mines, show that to the end of December, 1928, shipments of manganiferous material from Philipsburg amounted to 442,482 tons, classified as follows:

	To End of 1918, (War Period) Tons	1919-1928, Tons	Total, Tons
Crude ore (35 per cent or more of manganese) ..	200,079	30,700	230,779
Concentrate (about 70 per cent of manganese dioxide) ..	1,450	183,550	190,000
Tailings (about 20 per cent of manganese) ..	....	21,488	21,488
Low-grade crude ore (about 20 per cent of manganese) ..	....	215	215
Total shipments .....	....	....	442,482

On the assumption that 2½ tons of crude ore was required for each ton of concentrate produced, it appears that in round figures 427,500 tons of ore was milled. This amount, added to the crude ore shipped, gives a grand total of 658,500 tons mined.

Electric Sponge Iron Plant in Canada

Robert Turnbull, president of the Volta Mfg. Co., Welland, Ont., who has developed a process for the reduction of iron ore by electrometallurgical methods, has with his associates, F. A. J. FitzGerald and J. Kellener, of the FitzGerald Laboratories at Niagara Falls, N. Y., secured a site at Sault Ste. Marie for the establishment of a plant to manufacture sponge iron and steel.

Two furnaces are to be built at once at a cost of \$75,000, and it is understood further expenditure is contemplated. The site was secured from the Algoma Steel Corporation and construction will commence in the next few weeks.

Since the Government of Ontario plans to pay a bonus of 1c. a unit on all iron ore mined in the province and will introduce legislation at the next session of the legislature to give effect to this bonus, Mr. Turnbull's experimental work has an immediate

practical interest, it is pointed out. His process would convert the ore at the mine into what he terms sponge iron. He claims that steel made from sponge iron in the open-hearth or electric furnace is of much higher quality than steel made from a mixture of ordinary steel scrap and pig iron. The proponent of the project states:

Our work to date leads us to believe that we are working in the right direction. We have made sponge iron and we have made it from refractory ores of Canada. Our furnace design will, I believe, lend itself to a satisfactory solution of what today I think is the most important problem confronting the iron and steel manufacturer—a method of producing iron cheaply and from ore which today the blast furnace cannot handle.

The new process is said to reduce, by electricity, the low-grade iron ores to sponge iron without the use of carbon, by melting the iron content without affecting the impurities. The ore would be reduced in two separate chambers—one heated by electric resistors and the other a preheating chamber. It is claimed by those interested that not only will the process handle magnetite iron, but it will utilize all the present scrap iron, now shipped out of Canada for treatment. The reducing units are designated to be built in units of 30 tons. Definite information as to the details of the plan are not available.

Thomson and Gibb Welding Machine Companies Merge

A consolidation of the Thomson Electric Welding Co., Lynn, Mass., and the Gibb Welding Machines Co., Bay City, Mich., has been announced, the new company to be known as the Thomson-Gibb Electric Welding Co. Both plants will continue in operation.

The Thomson company was formed in 1886 to exploit the basis resistance welding patents of Prof. Elihu Thomson of Lynn, Mass. Professor Thomson has always been an officer and director of the Thomson company and will continue with the new company in both capacities. The Gibb company has specialized in seam welding.

The Thomson-Gibb Electric Welding Co. will offer a full line of butt, flash, seam, spot, protection, and wire fabric welders. It will maintain service engineers in all leading production centers.

"Methods of Test Relating to Electrical Insulating Materials" is the title of a pamphlet issued by the American Society for Testing Materials, Philadelphia. It contains all of the methods of testing such materials prepared by the society's committee D-9 and also contains the annual report of this committee, presented at the regular yearly meeting of the society at Atlantic City last June. The pamphlet also contains a few specifications prepared by other committees of the society which are of interest in electrical insulations. It contains approximately 200 pages.

Pacific Coast

Cast Iron Pipe Order of 3000 Tons Goes to France—Steel Demands Hold Up Fairly Well

SAN FRANCISCO, Oct. 26 (*By Air Mail*).—Awards of 1100 tons of structural steel shapes for an office building in Los Angeles, 600 tons of plates for a pipe line at Ashland, Ore., and 3000 tons of cast iron pipe for Ladner, B. C., were the outstanding developments of the week. Demand is holding up well and prices in most lines are well maintained.

Pig Iron.—Little of importance has occurred in the pig iron market. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	.....	25.00 to 26.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Reinforcing steel bar orders exceeded 1500 tons. The Blue Diamond Co. secured 800 tons for an office building in Los Angeles and the Pacific Coast Steel Co. took 600 tons for a pulp plant at Port Angeles, Wash., for the Olympic Forest Products Co. and 100 tons for a bridge over the North River at Olympia, Wash. Bids were opened on three bridge projects in Washington calling for more than 1400 tons. Bids are being taken on 100 tons for a mausoleum at Whittier, Cal. Prices on out-of-stock material in Los Angeles continue at 2.40c., base, on carload lots and at 2.70c. on smaller tonnages, while quotations in the San Francisco territory are \$2 a ton lower. Merchant bar steel holds at 2.35c., c.i.f. coast ports.

Plates.—The only important award of the week went to the Beall Tank & Pipe Co., Portland, Ore., and called for 600 tons of 24-in. welded steel pipe for Ashland, Ore. During the past several weeks, demand for plates has fallen off, and the only large inquiry now before the trade involves 1400 tons for a 36 to 48-in. welded steel pipe line at Everett, Wash., bids on which were opened this week. Prices continue general at 2.35c. on the usual run of the market, with \$1 to \$2 a ton lower quoted on sizable tonnages.

Shapes.—Among the larger structural lettings of the week were 1100 tons for the Los Angeles Stock Exchange Building, placed with the

Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	.....	3.30c.
Soft steel bars	.....	3.15c.
Small angles, 4-in. and over	.....	3.55c.
Small angles, under 4-in.	.....	3.75c.
Small channels and tees, 4-in. to 24-in.	.....	5.00c.
Spring steel, 1/2-in. and thicker	.....	4.90c.
Black sheets (No. 24)	.....	3.30c.
Blue ann'd sheets (No. 10)	.....	5.30c.
Galv. sheets (No. 24)	.....	5.65c.
Struct. rivets, 1/2-in. and larger	.....	\$3.40
Com. wire nails, base per keg	.....	3.40
Cement c'd nails, 100 lb. keg	.....

Consolidated Steel Corporation; 400 tons for a power house at North Bend, Ore., booked by the Minneapolis Steel & Machinery Co.; and 156 tons for an apartment house at Palo Alto, Cal., taken by McClintic-Marshall Co. Numerous small projects, ranging from 30 to 60 tons, were also placed. The largest pending inquiry calls for 2400 tons for the Eleventh Street viaduct, Tacoma, Wash., bids on which have been opened. Bids were also opened on 1000 tons for the Fourteenth Avenue South bridge, Seattle, and on 243 tons for the West Spokane Street bridge approach, Seattle. Prices remain unchanged and firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe has again fallen off. Only

one award of importance was reported. French interests secured 3000 tons of 2 to 12-in. Class B pipe for Ladner, B. C. The R. E. Hazard Contracting Co. was low bidder on 112 tons of 4 to 8-in. Class B pipe for Estelle Street, San Diego. No action has been taken by Burbank, Cal., on its inquiry for 261 tons of 6 and 8-in. Class B pipe, bids on which were opened Oct. 15. The University of California, Berkeley, has taken bids on 287 tons of 4 to 10-in. Class 150 pipe for delivery at Redwood City, Cal. Santa Ana, Cal., will open bids on Nov. 5 for 449 tons of 2 to 8-in. Class B pipe for the improvement of Dana Point.

Steel Pipe.—Movement of standard steel pipe is restricted, and stocks in distributors' hands are well rounded out. Los Angeles opened bids this week on 243 tons of 1 to 8-in. black and galvanized steel pipe. Pipe line inquiries have been few and far between of late.

Boston

Pig Iron Buying Light—Scrap Business Marking Time—Structural Steel Awards of 5000 Tons

BOSTON, Oct. 29.—A Rhode Island foundry divided an order for 1000 tons of malleable pig iron for December and first quarter delivery with two Eastern furnaces at prices equivalent to about \$17.50 a ton, Buffalo. Otherwise, sales of foundry iron were largely in car lots, and indications are that business during the remainder of 1929 will be comparatively light, owing to recent large buying of Southern iron for last quarter delivery. Buffalo district furnaces have obtained a further concession in the rail and water freight to \$4.05 a ton. Eastern iron, however, is offered at sufficiently low prices to meet the new rail and water rate that obtains only to the close of navigation, which probably will be around Nov. 15. While Alabama furnaces are holding to \$14.50 a ton, base furnace, for business in their immediate territory, as low as \$14 is being done in outside territories.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	.....	\$21.55 to \$22.05
†Buffalo, sil. 2.25 to 2.75	.....	22.05 to 22.55
*Buffalo, sil. 1.75 to 2.25	.....	22.41 to 22.91
*Buffalo, sil. 2.25 to 2.75	.....	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	.....	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	.....	23.15 to 23.65
Va., sil. 1.75 to 2.25	.....	25.21
Va., sil. 2.25 to 2.75	.....	25.71
*Ala., sil. 1.75 to 2.25	.....	24.11
*Ala., sil. 2.25 to 2.75	.....	24.61
†Ala., sil. 1.75 to 2.25	.....	20.25
†Ala., sil. 2.25 to 2.75	.....	20.75

Freight rates: \$4.91 all rail from Buffalo, and \$4.05 rail and water; \$3.65 all rail from eastern Pennsylvania; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Few municipalities are openly placing pipe orders, but quite a number of them are privately buying for late 1929 and early 1930

delivery. Tonnages involved in all instances, however, are small. Swampscott, Mass., placed 100 tons of 6 and 8-in. pipe with the United States Pipe & Foundry Co., and Ayer, Mass., bought 150 tons of 8 in. from the Warren Foundry & Pipe Co. Several New England utility companies are sounding out the market on large tonnages for spring delivery. Prices quoted openly on domestic pipe are: 4-in., \$44.10 to \$45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$40.10 to \$41.10; 16 to 20-in., \$39.60. A \$4 differential is asked on Class A and gas pipe.

Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	.....	3.365c.
Structural shapes—		
Angles and beams	.....	3.365c.
Tees	.....	3.365c.
Zees	.....	3.465c.
Soft steel bars, small shapes	.....	3.265c.
Flat, hot-rolled	.....	4.15c.
Reinforcing bars	.....	3.265c. to 3.54c.
Iron bars—		
Refined	.....	3.265c.
Best refined	.....	4.60c.
Norway rounds	.....	6.60c.
Norway squares and flats	.....	7.10c.
Spring steel—		
Open-hearth	.....	5.00c. to 10.00c.
Crucible	.....	12.00c.
Tie steel	.....	4.50c. to 4.75c.
Bands	.....	4.015c. to 5.00c.
Hoop steel	.....	5.50c. to 6.00c.
Cold-rolled steel—		
Rounds and hex.	.....	*3.55c. to 5.55c.
Squares and flats	.....	*4.05c. to 7.05c.
Toe calk steel	.....	6.00c.
Rivets, structural or boiler	.....	4.50c.
Per Cent Off List		
Machine bolts	.....	50 and 5
Carriage bolts	.....	50 and 5
Lag screws	.....	50 and 5
Hot-pressed nuts	.....	50 and 5
Cold-punched nuts	.....	50 and 5
Stove bolts	.....	70 and 10

*Including quantity differentials.

Warehouse Business.—Wire nails have been reduced another 10c. per keg, making a total cut during October of 20c., and the price from stock today is \$3.20, base. Staples also have been reduced 10c. to \$6.05 a keg from stock. Aggregate weekly warehouse shipments are moderately large, but individual orders are small. Owing to continued competition from foreign material, list prices are not rigidly maintained.

Reinforcing Bars.—Business in billet steel bars is by no means brisk, but it is more active than recently. The largest award of the week was 300 tons for a local hotel to the Northern Steel Co., and the next largest was 200 tons for tunnel work in Cambridge, Mass., to the Concrete Steel Co. The Barker Steel Co. took 100 tons for the Warren Foundry & Pipe Co. foundry at Everett, Mass. Prices quoted openly are 2.61½c. a lb., base, from stock on large tonnages and 3.16c. for small lots, but large-lot prices have had to be shaded before buyers would place orders. The rail steel bar market is quiet at 2.26½c. a lb., base, delivered common Boston freight rate points.

Structural Steel.—Fabricated structural steel lettings the past week approximated 5000 tons, 1300 tons of which is for a 1000-ft. radio tower at South Dartmouth, Mass., and 1050 tons is for a Boston bridge. The 5000 tons does not include numerous jobs amounting to less than 100 tons each.

Coke.—Effective Nov. 1, New England by-product foundry coke ovens will accept contracts for first half 1930 delivery on a sliding price scale basis, the price to be determined the first of each month. The prevailing price, \$11 a ton, delivered within a \$3.10 freight rate zone, will obtain in November. Foundry coke shipments are

slightly in excess of those for September, but about 20 per cent less than those for October, 1928. August was the peak month in shipments so far this year.

Old Material.—Scrap prices appear steadier, although there is scarcely enough business to test prices. Dealers' stocks are small, and manufacturing plants are disinclined to sell scrap at prevailing prices. A Worcester, Mass., mill is buying some long bundled skeleton on a basis of \$9 to \$9.50 a ton, on cars shipping point, and No. 1 heavy melting steel on a basis of \$13.25 a ton, delivered. Comparatively little material is moving into the Pittsburgh territory. The Boston Elevated Railway closes bids Oct. 31 on miscellaneous material, the largest item being 500 tons of girder rails, and the Boston & Albany Railroad will sell a small list of miscellaneous material on Nov. 1. An Italian steamer cleared here the past week with 6500 tons of light rails, of which 1500 tons was loaded here and 5000 tons at a Southern port. The rails will be cut into short lengths and will be used as boundary markers in Egypt.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$10.75 to \$11.25
Scrap T rails	10.50 to 10.75
Scrap girder rails	9.50 to 10.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	12.00 to 12.50
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

an increase over the preceding month. Other warehouse lines also are said to be fairly good. Structural fabricators and rolling mills specializing in reinforcing bars are complaining of poor business. No sizable contracts have been placed in some time and only one project is being figured on.

Coke.—The movement of domestic coke continues heavy, and piles at by-product ovens in the district are being reduced considerably. There is a good demand for foundry grades, and smelters continue to take full schedules of furnace coke.

Old Material.—Consumers in the St. Louis industrial district are buying very little old material. One large mill gives as a reason that prices are too high, while others state that their order files do not justify additional purchases at this time. The movement of old material from the country dealers is small because of the low prices. Miscellaneous standard-section rails and bundled sheets are off 25c. a ton, while steel car axles and railroad malleable are 50c. a ton lower. Railroad lists: Union Pacific, 2250 tons; Big Four Lines, 950 tons; Chicago, Milwaukee, St. Paul & Pacific, 360 tons and 120 carloads; St. Louis-San Francisco, 40 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.50 to \$14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.50 to 16.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	15.00 to 15.50
Railroad springs	16.75 to 17.25
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	13.00 to 13.50
Rails for rolling	15.75 to 16.25
Machine shop turnings	7.50 to 8.00
Heavy turnings	9.50 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	27.50 to 28.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.25 to 12.50
Agricult. malleable	15.25 to 15.75
Relay rails 60 lb. and under	20.50 to 23.50
Relay rails 70 lb. and over	26.50 to 29.00

St. Louis

Pig Iron Sales for First Quarter Total 2000 Tons—Further Declines in Scrap Prices

ST. LOUIS, Oct. 29.—An improvement in buying of pig iron was noted during the last week, although the market is still quiet as a result of the heavy purchases made by melters more than a month ago. Melters' requirements for the remainder of the year seem to be well taken care of. Of the week's sales of 4500 tons by the St. Louis Gas & Coke Corporation, two lots of 1000 tons each were for first quarter shipment, one lot being for a local jobbing foundry and the other for an Iowa melter. Sales also included 2000 tons of basic to a local company for prompt shipment, 200 tons of foundry iron to an Iowa implement manufacturer and 100 tons each to a local stove manufacturer, a car builder and a jobbing foundry.

Business is good with the foundries, except those catering to the automotive industry. The pig iron market is firm, with improvement in the Southern situation noticeable.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$19.50 to \$20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Steel.—Although new business in plates, shapes and bars for mill shipment is dull, warehouse buying is better, and October will show

Warehouse Prices, f.o.b. St. Louis

Base per Lb.	
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.10c.
Per Cent Off List	
Tank rivets, 1/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Cincinnati

Pig Iron Buying Cautious as Melt Declines, But Prices Are Steady—Cast Grades of Scrap Weaker

CINCINNATI, Oct. 29.—With district consumers of pig iron apparently either well supplied with material for the fourth quarter or withholding purchases until the demand for finished products increases, sales of pig iron in this district declined noticeably last week. The largest order reported among the 2500 tons of iron sold was from a Dayton, Ohio, consumer for 200 tons of Northern foundry for fourth quarter. The remainder of the business was in carload and 100-ton lots. Although pig iron is being sold daily, there are no large tonnages. District sellers report that the melt, particularly in the automobile foundries, is easing off. Prices on both Northern and Southern iron are steady, with Southern still quoted at about \$14 to \$14.50, base Birmingham.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$19.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25 17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75 18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25 17.69 to 18.19
S'th'n Ohio silvery, 8 per cent 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$2.69 from Birmingham.

Finished Materials.—The anticipated increase in production schedules of district sheet mills was realized last week. Although specifications from the automotive field are still below normal, the general sheet demand is being sustained at a good rate. Accordingly, fresh bookings last week were about equal to capacity. With the backlogs of district mills substantially reduced and the delivery situation easier than it has been for months, district consumers are not overspecifying as they did during the summer. While the sheet demand is again reaching normal proportions, interest in cold and hot-rolled strip is still sharply reduced.

Coke.—The total amount of by-product foundry coke moved on contract during October was noticeably

less than the total during September. District oven representatives say that a slackening of the automotive demand has caused foundries to specify more cautiously. Specifications last week were a trifle less than the week before and no new business of any size was reported. Prices for the next month on by-product foundry coke will continue at about \$10.05, delivered in Cincinnati.

Old Material.—While some mills are still taking scrap on contract at a fair rate, others, particularly in the Valley, are reducing specifications, and in several instances dealers have

received cancellations. The market is weaker this week than last. This is shown by the reduction of prices 25c. on 10 items, for the most part in the cast iron grades. The steel grades, however, are still selling at unchanged prices, because the supply is still none too large.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting....	14.00 to 14.50
Loose sheet clippings.....	8.50 to 9.00
Bundled sheets.....	10.75 to 11.25
Cast iron borings.....	8.75 to 9.25
Machine shop turnings....	8.00 to 8.50
No. 1 busheling.....	10.50 to 11.00
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	14.25 to 14.75
No. 1 locomotive tires....	14.25 to 14.75
No. 2 railroad wrought....	13.00 to 13.50
Short rails.....	18.50 to 19.00
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.75 to 19.25
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast.....	10.25 to 10.75
Stove plate.....	10.25 to 10.75
Brake shoes.....	10.00 to 10.50
Agricultural malleable....	14.00 to 14.50
Railroad malleable.....	15.00 to 15.50

Birmingham

Advance on Alabama Iron for First Quarter Talked of—Good Business in Finished Steel

BIRMINGHAM, Oct. 29.—The pig iron market was quieter during the past week than for some time. Sales are for small fill-in tonnages confined to the local trade. There have been no local inquiries for first quarter iron. Inquiries from outside districts continue to filter in, but producers are not quoting on first quarter business. Talk of an advance in prices is frequently heard, and it is generally predicted that quotations will be 50c. or \$1 a ton higher when books are opened for the next period. The base price is now \$14.50. There has been a further reduction of stocks this month, though the volume of shipments has fallen a little short of that of September. Current shipments still exceed the make. Fifteen furnaces are active, the same as in the past two weeks. Of this number, seven are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.....	\$14.50
No. 1 fdy., 2.25 to 2.75 sil.....	15.00
Basic.....	14.50

Finished Steel.—The past week was the best of the month in new business. This business is coming from the regular trade and is shared in by bars, plates, structural shapes, sheets and railroad accessories. Operations are now above 80 per cent of ingot capacity and are considerably higher than one year ago. The market has a firm tone, with prices unchanged. The fabricated structural steel market is regaining some of its former strength. The Gulf States Steel Co. has placed an order with the Ingalls Iron Works Co. for 1000 tons for its new plate mill at Alabama City and expects to place a larger order shortly for its new sheet mill. The Tennessee company is working all eight open-hearths at Fairfield, an increase of

one over last week. Eight of nine are active at Ensley. The Gulf States Steel Co. continues to work all six at Alabama City.

Cast Iron Pipe.—An improvement in inquiries and small spot orders during the last three or four days has produced a little better feeling in the market. Sales for the two weeks preceding had been considered the lightest for any comparable period this year. Shipments continue to approximate the make, and backlogs are slender. Dallas, Tex., opened bids Oct. 28 on 4000 tons of pipe. Kansas City, Mo., opens bids today on 2000 tons of large diameter pipe. If the decision pending at St. Petersburg, Fla., is decided in favor of cast iron pipe, about 1000 tons will be required. Bids to be opened by Murfreesboro, Tenn., on Nov. 5 call for one mile of 12-in. and two miles of 8-in. pipe. Greenville, Ala., is taking bids until Nov. 1 for 6000 ft. of 6-in. pipe. Base prices remain at \$37 to \$38.

Coke.—Industrial coke is quiet in new business. The movement on contracts is considered fair. Prices remain at \$5 a net ton, Birmingham.

Old Material.—Demand for important steel grades is holding up well, though mills are placing spot orders and keeping stocks low. Consumer interest is still lacking in iron scrap. Quotations are unchanged. In the iron grades they are nominal.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap steel rails.....	14.00
Short shoveling turnings..	9.00
Cast iron borings.....	9.00
Stove plate.....	11.50 to 12.00
Steel axles.....	21.00
Iron axles.....	23.00
No. 1 railroad wrought....	10.00 to 10.50
Rails for rolling.....	15.50
No. 1 cast.....	13.00
Tramcar wheels.....	12.50
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem....	13.50 to 14.00

Warehouse Prices, f.o.b. Cincinnati

Base per Lb.	
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfoc. bars.....	3.15c.
Rail steel reinfoc. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.85
Cement c'd nails, base 100 lb. keg.....	2.85
Chain, per 100 lb.....	8.75
Net per 100 Ft.	
Lap-weld steel boiler tubes, 2-in.....	\$16.50
4-in.....	34.50
Seamless steel boiler tubes, 2-in.....	17.50
4-in.....	36.00

Buffalo

With Fourth Quarter Needs Well Covered, Pig Iron Buying Declines—No Recovery in Steel Operations

BUFFALO, Oct. 29.—Fourth quarter requirements for pig iron have been well covered, and inquiries have dropped off. A New Jersey foundry which sought 3000 tons of foundry is understood to be still in the market. It is also said that an agricultural implement maker is in the market for 1000 tons of foundry and malleable. Other inquiries are of a minor character. Furnace men report that the melt throughout the district is good and that shipments are steady. A survey shows that the locomotive plants are busy and that the heater industry is fairly active.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$19.50
No. 2X fdy., sil. 2.25 to 2.75.....	20.00
No. 1 fdy., sil. 2.75 to 3.25.....	21.00
Malleable, sil. up to 2.25.....	20.00
Basic.....	\$17.50 to 18.00
Lake Superior charcoal.....	27.28

Old Material.—Aside from the purchase by the largest consumer of upward of 5000 tons of No. 1 heavy melting steel at \$15, the most important event of the past week was the suspension of shipments by another steel company. This mill will not receive any scrap until Nov. 4, and after that time will place its receipts on a quota basis. Almost all of the commodities in the list show a sentimental weakening and the entire market is softer. Steel castings plants appear to be busy.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$15.00 to \$16.00
No. 2 heavy melting steel.....	13.50 to 14.50
Scrap rails.....	15.00 to 15.50
Hydraul. comp. sheets.....	13.50 to 14.50
Hand bundled sheets.....	11.00 to 11.50
Drop forge flashings.....	13.75 to 14.00
No. 1 busheling.....	13.50 to 14.50
Hvy. steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	7.50 to 8.00
No. 1 railroad wrought.....	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers.....	17.00 to 17.50
Coil and leaf springs.....	17.00 to 17.50
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends.....	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings.....	11.25 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings.....	11.25 to 11.75
Cast iron borings.....	11.25 to 11.75
No. 2 busheling.....	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles.....	17.00 to 17.50
Iron axles.....	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast.....	15.00 to 15.50
Stove plate.....	12.50 to 12.75
Locomotive grate bars.....	11.00 to 11.50
Steel rails, 3 ft. and under.....	18.75 to 19.00
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades:	
Industrial.....	17.50 to 18.00
Railroad.....	17.50 to 18.00
Agricultural.....	17.50 to 18.00
Special Grades:	
Chemical borings.....	12.50 to 13.50

Finished Iron and Steel.—Operations of Buffalo mills have not receded during the past week, neither have they increased. Activity in the fabricated structural field has declined to the point where no sizable tonnages have been placed or are in immediate

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.95c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

prospect. A contract was awarded for 103 tons of rail steel bars for the new City Hall. There will be about 1000 tons of reinforcing bars in the City Hall, but this contract will be let piecemeal. Reinforcing bar makers report a considerable volume of small lots placed.

Canada

Pig Iron Demand Is Holding at High Level

TORONTO, ONT., Oct. 29.—As a result of the continued heavy pig iron melt by foundries and other consumers in Ontario and Quebec, the demand for merchant iron is holding at a good level, with shipments near the high point for the year. Future buying continues to dwindle, but the spot demand is showing improvement. Hand-to-mouth buyers are showing rather keen interest in the market, and, due to the fact that they are carrying only small tonnages in stock, are forced into the market at regular intervals. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.10
Malleable.....	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$25.00
No. 2 fdy., sil. 1.75 to 2.25.....	24.50
Malleable.....	25.00
Basic.....	23.50
Imported Iron, Montreal Warehouse	
Summerlee.....	\$33.50
Carron.....	33.00

Structural Steel.—A decline in demand has set in, with only small tonnage orders reported for the week. Some substantial tonnages, however, are pending and will swell sales later in the year. Fabricators state that unfilled orders will maintain capacity operations for about a year.

Old Material.—A stronger market has developed in iron and steel scrap during the past week or 10 days. Consumers are buying more extensively for immediate needs, and there is also a better flow of forward delivery business. Mill requirements are comparatively small at the present time, but these consumers are taking scheduled delivery against contracts and also

placing spot orders for special grades. In the Montreal district the domestic demand has strengthened and shipments to United States points are holding at a satisfactory level. Purchases are being made at unchanged prices.

Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.....	\$10.00		\$8.50
Rails, scrap.....	11.00		9.00
No. 1 wrought.....	10.00		12.00
Machine shop turnings.....		7.50	5.00
Boiler plate.....		7.50	6.00
Heavy axle turnings.....		8.00	7.50
Cast borings.....		7.50	5.00
Steel borings.....		7.50	6.50
Wrought pipe.....		6.00	6.00
Steel axles.....		15.00	20.00
Axles wrought iron.....		17.00	22.00
No. 1 machinery cast.....			17.00
Stove plate.....			13.00
Standard carwheels.....			16.00
Malleable.....			13.00
Per Net Ton			
No. 1 mach'ry cast.....	\$16.00		
Stove plate.....	12.00		
Standard carwheels.....	15.00		
Malleable scrap.....	14.00		

Youngstown

Valley Mills at Low Point of the Year

YOUNGSTOWN, Oct. 29.—Executives of leading steel companies advise that new business is showing improvement, especially from the automobile industry and they expect this betterment to be manifested in broader production schedules in November. Both the volume of inquiries is stronger and the tonnage involved is larger.

In the meantime, however, production has declined in the Mahoning Valley to the lowest point of the year, averaging about 65 per cent. Of 51 independent open-hearth furnaces, only 30 are active, while 80 of 120 Valley sheet mills are operating. Pipe departments present the strongest schedulings, with 15 of 21 mills running, but tube backlogs are being depleted. Tin mill schedules are also reduced, but it is expected 1930 buying will develop in November, and will serve to stimulate this market.

Some departments at the Ohio works of the Carnegie Steel Co. are completely idle. In this complement, four of six blast furnaces are active.

The Republic Iron & Steel Co. is operating its small-diameter tube mill, producing pipe up to 7 in. by the electric welding process, regularly on commercial production. The company has secured a number of orders for feeder lines to larger pipe line projects. At its Warren works, Republic has completed the conversion of sheet mills to tin mills, and has started construction of its new mechanical tubing plant.

Bantam Ball Bearing Co., South Bend, Ind., has completed a brass foundry in which castings required in the manufacture of ball and roller bearings are made. C. O. Hiler is in charge.

Corporation Declares Extra Dividend

Strong Third Quarter Earnings Statements of United States, Bethlehem and Other Companies

AN extra dividend of \$1 a share on the common stock, payable with its regular quarterly dividend of 1% per cent, was declared by the directors of the United States Steel Corporation at its meeting in New York, Oct. 29. Earnings for the first nine months of 1929 were equivalent to 15.82 per cent on the common shares outstanding as compared with 8.17 per cent for the same period of 1928. In the light of these earnings the directors voted the extra dividend.

Total earnings for the third quarter were roughly \$70,174,000, or close to the nearly \$72,000,000 of the second quarter. The principal figures of the earnings statement are given in the accompanying table.

The quarter's net earnings available for common dividends amounted to \$45,270,431, or nearly \$5.87 per share of the 8,131,071 shares outstanding on Oct. 29. The earnings per share on 8,030,304 shares in the second quarter amounted to \$5.92. To express further the comparisons between this year and last, it may be mentioned that total earnings for nine months were \$202,274,555 in 1929 and \$140,015,494 in 1928.

Action on the proposed purchase of the properties of the Columbia Steel Corporation was postponed, and the option expiring Oct. 29 was extended to Oct. 31.

Bethlehem's Third Close to Second Quarter

The Bethlehem Steel Corporation reported net income for the third quarter of \$11,384,720, or nearly three times the net income for the corresponding quarter last year and only 3.2 per cent less than the total of \$11,766,473 for the second quarter of 1929.

Earnings for the third quarter, after deducting all charges and dividends on the preferred stock, were equivalent to \$4.01 a share on the

2,400,000 shares of common outstanding during the period, compared with \$4.17 a share for the second quarter.

In presenting the report Eugene G. Grace, president, declared that business conditions are sound and that current pessimism in the stock market is unwarranted. Billing prices for the company were 10c. a ton lower in the third quarter than in the previous quarter, but \$1.56 a ton higher than in the third quarter of last year. Orders on hand, however, showed improvement, amounting to \$61,070,000 at the end of the third quarter, compared with \$56,830,000 at the end of the preceding period, a gain of 7.5 per cent.

Operations in the third quarter averaged 97.8 per cent of rated capacity, compared with 100.6 per cent in the quarter ended on June 30 and 82.3 per cent in the third quarter of 1928. At present, he said, production is at 82 per cent of capacity.

The company's railroad car bookings are the best in eight years, and the Bethlehem shipyards will enter 1930 with the best schedule in years.

Bethlehem's Expansion Program

President Grace announced an expansion program that will increase the company's ingot capacity 1,250,-

000 tons annually and its by-product coke oven capacity 1,000,000 tons. Improvements will be mainly at the Sparrows Point and Lackawanna plants. Additions will be made to plate, sheet and roughing mills at the former plant and to the roughing and billet mills at Lackawanna. An important part of the improvements to be undertaken will be a system of cleaning and distributing by-product coke and blast furnace gas at various plants, thereby reducing the company's coal consumption. The expansion program will cost \$50,000,000.

Directors declared the usual quarterly dividend of \$1.50 a share on the common stock and \$1.75 a share on the preferred stock.

Republic and Gulf States Report Earnings

The Republic Iron & Steel Co. reports net profits, after all deductions, of \$2,527,094 for the third quarter, as compared with \$3,263,309 for the June quarter and \$2,877,127 for the March quarter and \$1,280,775 in the September quarter of 1928. The total profit for nine months is \$8,667,530.

The Gulf States Steel Co. had net profit of \$326,975 in the third quarter, compared with \$405,630 in the preceding quarter and \$139,850 in the September quarter of 1928. Net profit for nine months of this year is \$1,086,860.

The Virginia Iron, Coal & Coke Co. reports a net loss for the third quarter of \$11,929. Net loss for nine months is \$39,893.

Recasts Steel Founders' Organization

CHICAGO, Oct. 29.—Large attendance and a high degree of enthusiasm marked the meeting held today by the Steel Founders' Society of America at the Hotel Sherman, Chicago. Granville P. Rogers, Graybar Building, New York, managing director of the society, read a survey-report of the industry. This report was unanimously adopted. New by-laws, designed to permit the right mechanical structure for carrying on the work of the society and to add flexibility to membership participation in affairs of the society, were read and adopted.

New officers elected are: President, J. E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; vice-president, Eastern Division, W. H. Worrlow, Lebanon Steel Foundry, Lebanon, Pa.; vice-president, Central Atlantic Division, John E. Galvin, Ohio Steel Foundry, Lima, Ohio; vice-president, Midwest Southern Division, Arthur Simonson, Falk Corporation, Milwaukee; vice-president, Mid-Continental Division, E. H. Cornelius, Oklahoma Steel Castings Co., Tulsa, Okla.

New directors are: Eastern Division, R. J. Doty, Reading Steel Casting Co., Reading, Pa.; W. M. Faison, Atlantic Steel Castings Co., Chester, Pa.; G. R. Casey, Treadwell Engineering Co., Easton, Pa. Central Atlantic

Division, H. J. Koch, Fort Pitt Steel Casting Co., Pittsburgh; Clarence W. Howatt, Pittsburgh Steel Foundry Co., William Powell, Mesta Machine Co., Pittsburgh. Midwest Southern Division, S. W. Utley, Detroit Steel Casting Co.; J. T. Oster, Hubbard Steel Foundry Co., East Chicago, Ind., and L. S. Peregoy, Sivy Steel Casting Co., Milwaukee.

Two Large Ships to Be Built at Fore River

WASHINGTON, Oct. 29.—Two combination passenger-cargo vessels of 11,300 deadweight tonnage will be built in the Fore River, Mass., yard of the Bethlehem Shipbuilding Corporation for the Oceanic Steamship Co. They will be among the largest ships ever to be built in an American yard and will have a 20-knot speed and will be superior in type to others engaged in the San Francisco-Australian trade for which they have been designed. Contracts covering loans of \$11,700,000 to apply on the cost of construction of the two vessels have been signed by Chairman T. V. O'Connor of the Shipping Board, W. P. Roth of the Oceanic company and E. P. Hill of the Bethlehem corporation.

Earnings of United States Steel Corporation

Earnings for Third Quarter, 1929		Total Earnings
July, 1929		\$24,303,058
Aug., 1929		24,687,089
Sept., 1929		21,183,566
Total earnings after deducting expenses, taxes and interest		\$70,173,713
Less charges and allowances for depletion, depreciation and obsolescence		16,819,393
Net income		\$53,354,320
Deduct: Interest corporation bonds		1,778,970
Balance		\$51,575,350
Dividends:		
Preferred, 1%		
per cent.	\$6,304,919	
Common, 2%		
per cent.	22,360,984	
		28,665,903
Surplus for the quarter.		\$22,909,447

Non-Ferrous Metal Markets

All Markets Inactive—Lead and Zinc Lower—Copper Unchanged—Tin Erratic

NEW YORK, Oct. 29.

DRASTIC declines in the New York stock market have had their effect abroad so as to cause declines in some metals in the London and other markets. Not only has this retarded buying in this country, but it has held up purchases from abroad. Lead and zinc have both declined in the last week or so and tin fell precipitately a little earlier. Copper is the metal that has been least affected.

Copper.—Buying of copper is almost at a standstill except possibly from abroad, and this has been decidedly retarded in the last few days. While sellers here do not expect a decline in the price, consumers are aware of the fact that it will not advance and they are also uncertain as to the effect of the stock market on future business. Domestic buying is only of the hand-to-mouth variety. November requirements are not yet covered and very little has been bought for December. Consumers abroad have still considerable to buy for early consumption, but are in no hurry to cover. Copper is the only metal that has not declined during the stock market upheaval. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and the price of Copper Exporters, Inc., is still 18.30c., c.i.f. European ports. Lake copper is unchanged at 18c. to 18.12½c., delivered.

Tin.—Sales of spot Straits tin were not over 400 tons for the week ended Oct. 26, the inactivity being traced largely to the stock market. Strange to say, tin has remained fairly steady in the past week, it having had its first precipitate decline about two weeks ago, with another a week ago. There is, however, no confidence, and consumers are buying only a little as they need it, mostly spot metal. Dealers are doing nothing. October shipments from the Straits are again revised lower, the estimated total being now put at 8500 tons, as against about 10,000 tons early in the month. Prices in London today were about £2 a ton higher than a week ago, with spot standard quoted at £184 5s., future standard at £188 5s. and spot Straits at £188 10s. The Singapore market today was £189 2s. 6d. In the New York market today, spot Straits tin was quoted at 40.75c., which is only a little higher than the low point of 40.25c. on Oct. 21, the lowest level

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 29	Oct. 28	Oct. 26	Oct. 25	Oct. 24	Oct. 23
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	40.75	40.75	40.75	41.37½	41.87½	42.25
Zinc, East St. Louis.....	6.60	6.60	6.65	6.70	6.70	6.70
Zinc, New York.....	6.95	6.95	7.00	7.05	7.05	7.05
Lead, St. Louis.....	6.55	6.65	6.70	6.70	6.70	6.70
Lead, New York.....	6.75	6.90	6.90	6.90	6.90	6.90

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	23.25c.
Copper, hot rolled.....	26.75c.
Zinc	10.25c.
Lead (full sheets).....	11.00c. to 11.25c.
Seamless Tubes—	
High brass	28.25c.
Copper	29.25c.
Rods—	
High brass	21.25c.
Naval brass	24.00c.
Wire—	
Copper	19.87½c.
High brass	23.75c.
Copper in Rolls.....	26.75c.
Brazed Brass Tubing.....	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—		Base per Lb.
High brass	23.25c.	
Copper, hot rolled.....	27.75c.	
Copper, cold rolled, 14 oz. and heavier	30.00c.	
Zinc	10.75c.	
Lead, wide	11.35c.	
Seamless Tubes—		
Brass	28.25c.	
Copper	29.25c.	
Brass Rods	21.25c.	
Brazed Brass Tubes.....	31.00c.	

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass.....	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes.....	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.
Brass Rods.....	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.75c. to 11.25c.
Zinc sheets, open.....	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	43.00c. to 44.00c.
Tin, bar	45.00c. to 46.00c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig.....	7.62½c. to 8.12½c.
Lead, bar	9.62½c. to 10.12½c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½.....	29.00c. to 30.00c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	46.50c.
Tin, bar	48.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	8.00c. to 8.25c.
Lead, American pig.....	7.55c. to 7.75c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	18.75c.
Babbitt metal, high grade.....	50.50c.
Solder, ½ and ½.....	29.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	15.00c.	16.25c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.75c.	13.75c.
Brass, heavy.....	8.25c.	9.25c.
Brass, light.....	7.00c.	8.00c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings.....	11.25c.	12.25c.
Lead, heavy.....	5.50c.	6.00c.
Lead, tea.....	4.25c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum.....	13.25c.	15.50c.
Cast aluminum.....	11.75c.	13.75c.

since Aug. 21, 1923. The market today was exceedingly inactive.

Lead.—Today the American Smelting & Refining Co. reduced its contract price from 6.90c. to 6.75c., New York. As a result, leading producers in the West reduced their price to 6.55c., St. Louis. As in the case of other metals, buying has been very light and largely hand-to-mouth.

Zinc.—Due to lower prices at London, quotations for prime Western zinc fell again yesterday from 6.70c. to 6.60c., East St. Louis, under much the same conditions as a week ago. Of course, the decline this week and last has not stimulated buying, which continues spasmodic. The price for ore continues unchanged at \$44, Joplin, and sales were light at 8970 tons for the week ended Saturday, Oct. 26. Production was fairly large at 13,600 tons for the week, leaving the surplus still high at 43,620 tons.

Antimony.—Consumers and dealers have been active, and the price of Chinese metal is unchanged at 8.75c., New York, for all positions. Cables to importers here indicate that the revolutionary disturbances in China are affecting freight rates, and higher prices are probable.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 29.—Prices for tin are quoted up $\frac{1}{4}$ c. at the end of a week in which fluctuations were frequent. Sales of non-ferrous metals are in small volume. The old metal market is quiet and prices are nominal.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 41.50c.; lead, 6.80c.; zinc, 6.80c.; in less-than-carload lots, antimony, 9.75c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87 $\frac{1}{2}$ c.; all being dealers' prices for less-than-carload lots.

Gulf States Steel Co. and the Central Iron & Steel Co. have appointed the new firm of Pittman & Squires, Los Angeles and San Francisco, their California representatives. Frank Pittman and G. F. Squires are both well known on the Pacific Coast, Mr. Pittman having been associated for some years with C. W. Pike & Co. in Los Angeles and Mr. Squires was with the same company in San Francisco up to a few years ago, when he resigned to become sales manager for the Pacific Sheet Steel Co. Offices in Los Angeles have been opened in the Western Mutual Life Building and in San Francisco at 39 Natoma Street.

To Consider Depreciation on Equipment

Uniformity Desired in Computing Income Tax—Standards Being Compiled as a General Guide

WASHINGTON, Oct. 28.—The fourth annual conference of machinery and equipment associations will be held at the Chamber of Commerce of the United States here on Nov. 11. In announcing the conference, Secretary Philipp P. Gott said that among the subjects to be discussed will be those relating to depreciation on machinery and equipment, the Senate Finance Committee amendment in the tariff bill prohibiting American trade-marked imports, and discounts on motor equipment.

Concerning depreciation, the announcement stated that the trade associations, at the suggestion of the Treasury Department, undertook the study of rates of depreciation of machinery and equipment and that the department recently stated that it would discontinue such studies and would issue within a few months a publication containing rates of depreciation. Members of the associations, it was suggested, should examine the rates affecting their respective industries. The Bureau of Internal Revenue hopes to have the publication available by Jan. 1, though it may be delayed.

The publication will cover depreciation rates for all industries and will be the first of the kind ever prepared. The field work has been completed and the data compiled, and the material is now being edited. The undertaking required an enormous amount of work and has been made possible only through the cooperation of the industries of the country. The study, in the form in which it will

appear, was begun last May. Particular interest has been shown in the matter of depreciation by the machinery and equipment manufacturers and users. The rates to be presented in the bulletin will be used as a guide for industries, but their adoption will be in no way compulsory. The purpose of the Bureau of Internal Revenue is to determine rates of depreciation on as nearly correct a basis as possible and to give uniformity to the rates.

To Discuss Trademarks on Imports

The announcement of the forthcoming meeting of the machinery and equipment associations explained that the House tariff bill continues the provision in the existing Fordney-McCumber tariff act, making it unlawful to import merchandise of foreign manufacture if it bears a trademark owned by a citizen, corporation or association of the United States, unless a written consent of the owner of the trademark is produced at the time of making customs entry. The Senate committee amendment, however, struck out the consent provision so that prohibition of such imports is made unconditional.

Members of the associations have been asked if they have considered the effect on their industries if foreign governments retaliated by enacting similar provisions. They were also asked to give consideration as to the customs of the trade regarding discounts on products sold to those engaged in the manufacture of other products.

Midvale Co. Buys Chrome Alloy Foundry

Purchase of the Chrome Alloy Products, Inc., Conshohocken, Pa., by the Midvale Co., Nicetown, Philadelphia, is announced, marking the definite entry by the Midvale Co. into the field of high-grade chrome and chrome-nickel alloy castings. T. Holland Nelson, developer of the Conshohocken foundry, has been retained as consulting engineer and in an advisory capacity to work out problems of construction of materials resistant to heat and corrosion. This makes it possible for the process industries to have at their command the experience of the personnel of the Midvale Co. in securing special compositions in the most marketable form.

A battery of induction furnaces has recently been installed to furnish castings in any size from the smallest up to the capacity of the furnaces. The Midvale company meanwhile has obtained exclusive rights to manufacture in the United States those patented compositions of chrome and nickel with other alloys held by Com-

mentry-Fourchambault et Decazeville of Paris, France, commonly known as ATV-1, ATV-2, ATV-3, AMF, BTG, etc. It is also licensed under patents to Sir Robert Hadfield to produce steel of the composition of the Era ATV and Era HR grades.

Central Alloy to Install 25-Ton Electric Furnace

Plans for construction of a new 25-ton electric melting furnace by the Central Alloy Steel Corporation, Massillon, Ohio, have been announced by F. J. Griffiths, chairman of the company. The new equipment is required to provide for rapidly expanding demand for Nirosta, the new stainless steel manufactured by the company under Krupp license.

The new furnace will be located at the Canton works and its cost will approximate \$200,000. The company also has authorized an expenditure of new circle cutting equipment to provide increased facilities for special steel.

Fabricated Structural Steel

Awards of About 55,500 Tons Largely for Work in New York District—43,000 Tons in Inquiries

FABRICATED structural steel awards, at about 55,500 tons, again hit a good stride, but about two-thirds of the tonnage is for the New York district, making a comparatively small showing for the rest of the country. Likewise, the major part of the 43,000 tons in new projects emanates from the New York district. The largest job awarded was 13,200 tons for New York subway work. A New York office building takes 9300 tons, Long Island Railroad grade elimination work, 6000 tons, and a Brooklyn hospital, 5850 tons. New subway sections call for bids on 12,300 tons, two New York apartment buildings will require upward of 11,000 tons, an apartment building in Chicago, 4000 tons, and a St. Louis building, 4000 tons. Awards follow:

BELLE, W. VA., 100 tons, building for Du Pont Engineering Co., to Virginia Bridge & Iron Works.
PHILADELPHIA, 1560 tons, bridge at Henry Avenue on which Francis A. Canuso is contractor, to Phoenix Bridge Co.
ATLANTA, GA., 880 tons, railroad viaduct, to Virginia Bridge & Iron Co.
ASHLAND, KY., 300 tons, building for American Rolling Mill Co., to unnamed fabricator.
BOSTON, 1050 tons, Congress Street bridge, to McClintic-Marshall Co.
SOUTH DARTMOUTH, MASS., 1300 tons, radio tower, to International Derrick & Equipment Co.
JEWETT CITY, CONN., 468 tons, bridge, to American Bridge Co.
ENWOOD, VT., 280 tons, trash racks and trash rack supporters, Connecticut River Development Co., to two unnamed fabricators.
CONCORD, N. H., 200 tons, hospital unit, to F. P. Lyons & Co.
PROVIDENCE, R. I., 300 tons, hardware warehouse, to James H. Tower Iron Works.
SPRINGFIELD, MASS., 125 tons, Court House, to Harrmann Steel Co.
PITTSFIELD, MASS., 150 tons, school, to unnamed fabricator.
NEW YORK, 1000 tons, public school 105 in Bronx, to Easton Structural Steel Co.
NEW YORK, 13,200 tons, section 5, route 108 of subway in Queens, to McClintic-Marshall Co.
NEW YORK, 9300 tons, Salmon Building at Fifth Avenue and Forty-second Street, to McClintic-Marshall Co.
NEW YORK CENTRAL RAILROAD, 2300 tons, commissary building at 161st Street, New York, to McClintic-Marshall Co.
BROOKLYN, 5850 tons, King's County Hospital, to Harris Structural Steel Co.
LONG ISLAND RAILROAD, 6000 tons, grade crossing elimination, to American Bridge Co.
STATE OF NEW YORK, 450 tons, highway marker supports, to Buffalo Steel Co.
MOHAWK, N. Y., 150 tons, highway bridge, to American Bridge Co.
PASSAIC, N. J., 800 tons, United States Rubber Co. building, to American Bridge Co.
PHILADELPHIA, 450 tons, Stanley Film Exchange Building, to Cantley Co.
PENNSYLVANIA RAILROAD, 500 tons, electric transmission towers for electrification work at Morristown, N. J., to American Bridge Co.
STATE COLLEGE, PA., 480 tons, power house for Pennsylvania State College, to Pittsburgh Bridge & Iron Co.
BIG SANDY & CUMBERLAND RAILROAD, 275 tons, bridge at Devon, W. Va., to Virginia Bridge & Iron Co.
ALABAMA CITY, ALA., 1000 tons, plate mill for Gulf States Steel Co., to Ingalls Iron Works.
SAN ANTONIO, TEX., 300 tons, Curtis Flying Field building, to McClintic-Marshall Co.

MILWAUKEE ROAD, 100 tons, bridge, to an unnamed bidder.
CHICAGO, 950 tons, Wieboldt department store, to American Bridge Co.
CHICAGO, 1400 tons, Ruth garage, to American Bridge Co., previously reported to an unnamed bidder.
ST. LOUIS, 4500 tons, bridge for Missouri Pacific across Merrimac River, to American Bridge Co., previously reported to an unnamed bidder.
OMAHA, NEB., 1500 tons, Union Station, to McClintic-Marshall Co.
OMAHA, 700 tons, train shed, to American Bridge Co.
OMAHA, 300 tons, railroad station concourse, to Baxton Vierling Iron Works, local.
PALO, ALTO, CAL., 156 tons, apartment building on Forest Avenue, to McClintic-Marshall Co.
LOS ANGELES, 1100 tons, Los Angeles Stock Exchange office building, to Consolidated Steel Corporation.
SEATTLE, 100 tons, two buildings for Pacific Telephone & Telegraph Co., to Hofius Steel & Equipment Co. and Wallace Bridge & Structural Steel Co.
OLYMPIA, WASH., 118 tons, bridge over North River, to Poole & McGonigle.
MARSHFIELD, ORE., 400 tons, H. M. Bylesbee Co. power house, to Minneapolis Steel & Machinery Co.
ASHLAND, ORE., 600 tons plates, 24-in. welded steel pipe line, to Beall Pipe & Tank Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 5050 tons, apartment building for San Remo Towers, Inc., Seventy-fourth Street and Central Park West.
NEW YORK, 1100 tons, apartment building for Massasoitt Corporation at 50 East Seventy-ninth Street.
NEW YORK, 12,300 tons, section 10, route 107 of subway in Brooklyn.
NEW YORK, 6000 tons, apartment building and hotel at 981 Madison Avenue.
BROOKLYN, 1200 tons, New York Times plant.
STATE OF NEW YORK, 300 tons, highway bridges.
PASSAIC AND BERGEN COUNTIES, N. J., 600 tons, bridge across Passaic River.
STATE OF PENNSYLVANIA, 350 tons, four highway bridges.
AKRON, OHIO, 700 tons, building for Akron Times.
INDIANAPOLIS, 6270 tons, White River bridge for Indianapolis Union Railway, new bids to be asked for.
HARRISBURG, PA., 1700 tons, Farm Show building, general contract to Sinclair & Grigg, Philadelphia.
SOUTHERN RAILWAY, 500 tons, bridge over Savannah River near Augusta, Ga.
CHICAGO, 800 tons, apartment building at 1200 Stone Street; Smith & Brown, architects.

CHICAGO, 500 tons, Hugolet apartments; Schmidt, Gardner & Erickson, architects.

CHICAGO, 4000 tons, George W. Griffiths apartment building; Holabird & Roche, architects.

CHICAGO, 2100 tons, Lawson Memorial Y. M. C. A. building.

WAUKEGAN, ILL., 500 tons, building for Johns-Manville Corporation.

STATE OF MINNESOTA, 600 tons, highway bridges.

ST. LOUIS, 4000 tons, Wenzlick Tower building.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct; bids opened.

SEATTLE, 1000 tons, Fourteenth Avenue South bridge; Puget Sound Bridge & Dredging Co., low bidder.

SEATTLE, 243 tons, approach to West Spokane Street bridge; general contract to General Construction Co.

MONTEREY, CAL., 109 tons, bridges; bids opened.

Railroad Equipment

Rock Island In the Market for 5000 Cars

THE Chicago, Rock Island & Pacific has inquired for 5000 freight cars, the Pacific Fruit Express has ordered 400 refrigerator cars and the Pennsylvania has ordered 100 locomotives. The Chesapeake & Ohio will buy 100 to 130 locomotives. Details of the week's business follow:

Pacific Fruit Express has ordered 400 refrigerator cars from Pacific Car & Foundry Co.

Pennsylvania has ordered 100 locomotives, of which 50 will be built by Baldwin Locomotive Works, 25 by Lima Locomotive Works and 25 in railroad's own shops at Altoona, Pa. Company's shops will build 100 tenders also.

Rock Island will buy 1000 gondola, 1500 automobile, 2000 box, 250 stock and 250 flat cars.

Wabash will buy three baggage and mail cars.

Chesapeake & Ohio will buy 100 to 130 locomotives; one-half will be eight-wheel switching locomotives and the remainder 2-10-4 type.

Ford Motor Co. has ordered one 600-hp. and one 300-hp. oil-electric locomotive from Ingersoll-Rand Co. for its River Rouge plant. These locomotives will be furnished with General Electric equipment and will be built at the Erie works.

Five million cubic yards of earth are being carried on belt conveyors from Denny Hill to Elliott Bay in Seattle, Wash., in the regrading of Denny Hill. The earth is transported for over half a mile on conveyors which run overhead, clearing street car trolley wires and avoiding interference with general business and traffic. Belts are 36 in. wide, operate at a speed of 500 ft. a min. and have a capacity of 600 cu. yd. an hour. The various conveyor sections are 1360 ft., 920 ft. and 600 ft. long. The conveying system was furnished by the Link-Belt Co., Chicago.

PERSONAL

Weirton Steel Co. Changes; J. C. Williams President

As a result of the combination of the Weirton Steel Co., Weirton, W. Va., the Great Lakes Steel Corporation, Detroit, and the iron ore, blast furnace and steamship interests of the M. A. Hanna Co., Cleveland, the following changes have been made in the executive personnel of the Weirton company, and were announced by E. T. Weir, who will be chairman and chief executive of the new National Steel Corporation which results from the merger.

Mr. Weir becomes chairman of the board of directors of the Weirton company, and has been succeeded as president by J. C. Williams, heretofore first vice-president. In addition to H. D. Westfall, two new vice-presidents were elected: F. A. Hanlin, who has been secretary, and W. F. Morris, Jr., who has been general traffic manager. C. H. Hunt, chief engineer, was elected assistant to the president, and W. A. Murphy, who has been purchasing agent, was made secretary, succeeding Mr. Hanlin.

J. C. Williams was born at Kidwelly, Wales, March 31, 1876, and attended school in that country. His early experience in the steel business was obtained in Welsh mills and also in Italy. He came to the United States in 1897 and became superintendent of the Champion Iron & Steel Co., Muskegon, Mich. In 1903 and 1904 he was assistant superintendent at the National works, Monessen, Pa. In 1905, with E. T. Weir and others, he helped to organize the Phillips Sheet & Tin Plate Co., which purchased the Jackson Iron & Steel Works, Clarksburg, W. Va. He has been associated with Mr. Weir since that time. He is also president and a director of the Weirton Improvement Co. and a director of the Bank of Weirton, and is prominently identified with financial

that time has occupied positions in various departments of the Weirton Steel Co., which succeeded the Phillips organization. He is vice-president and a director of the Weirton Improvement Co., secretary and a director of the Weirton Coal Co., vice-president and a director of the Oak Hill Supply Co., and a director of the Bates Iron Co., besides holding directorships in various civic and financial organizations in Weirton and and civic organizations in Weirton and Steubenville, Ohio.

Mr. Hanlin was born in Midway, Washington County, Pa., Aug. 12, 1888, and attended schools of the North Side, Pittsburgh. His early business experience was obtained with Charles E. Pope and the Pope Tin Plate Co., with whom he became connected in 1904. When the Pope company was purchased by the Phillips Sheet & Tin Plate Co. in 1912, Mr. Hanlin went to Weirton and since Steubenville.

Mr. Morris was born at Mahoning, Pa., Aug. 23, 1877, and attended school in Pittsburgh. His early business experience was gained with the Pennsylvania Railroad, the Great Northern Railway, and the Crucible Steel Co. of America. He became associated with the Weirton company as traffic manager in 1920, and has made his headquarters in the Pittsburgh office.

Clinton H. Hunt was born at Cleveland, Dec. 14, 1883, and attended school at Ravenna, Ohio. He gained his early steel mill experience with the William Tod Co., Pittsburgh, the Morgan Engineering Co., Alliance, Ohio, the Carnegie Steel Co. and the Youngstown Sheet & Tube Co. He went with the Weirton company as chief engineer in 1915, and has held that position continuously since.

Wilmer A. Murphy was born at Barnesville, Ohio, Feb. 22, 1899, and attended school in that city. He was

employed for a time by the La Belle Iron Works, Steubenville, Ohio, now a part of the Wheeling Steel Corporation, and went with the Weirton company in 1922 as assistant purchasing agent.

J. K. MERWIN, formerly of the Cleveland office of the Chain Belt Co., Milwaukee, has been placed in charge of the newly-opened Boston office of the company.

P. J. HALE has been appointed resident engineer for Freyn Engineering Co., Chicago, in connection with the blast furnace to be built near London for the Ford Motor Co. He sailed on Oct. 25 for England.

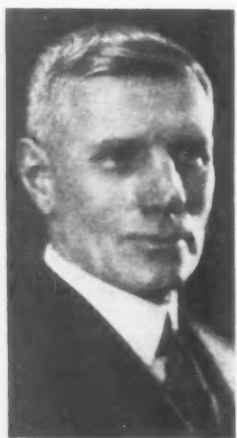
E. G. JONES, formerly of the Canadian Brake Shoe Co., Ltd., has become superintendent of the plant of the Joliet Steel, Ltd., Joliet, Que. J. CRITCHLEY has been appointed sales engineer.

HERBERT E. FENNER, general service manager of the American Bosch Magneto Corporation, Springfield, Mass., sailed from New York on an extended tour of the principal cities of South America.

C. R. BURT, vice-president and general manager of Pratt & Whitney Co., Hartford, Conn., will address a joint meeting of the Providence section of the American Society of Mechanical Engineers and the management section of the Providence Engineering Society, Nov. 5, at the rooms of the latter society, on "Modernizing an Old New England Industry."

GEORGE R. ROBERTS has been placed in charge of the newly-established Los Angeles office of Alexander Milburn Co., manufacturer of welding and cutting apparatus, Baltimore.

HENRY J. FREYN, president, Freyn Engineering Co., Chicago, returned Oct. 26 on the Aquitania from a two months' business trip in Russia, England, Germany and France.



J. C. Williams, new president, Weirton Steel Co.



F. A. Hanlin, former secretary, now vice-president, Weirton Steel Co.



J. F. Morris, former general traffic manager, now a Weirton vice-president



C. H. Hunt, former chief engineer, named assistant to president of Weirton



R. J. WYSOR

R. J. WYSOR, since January, 1928, general manager of the Jones & Laughlin Steel Corporation, Pittsburgh, has resigned and, with his former chief, T. M. GIRDLER, recently president of the Jones & Laughlin company, will become associated with the Otis & Co.-Eaton-Mather group in Cleveland. Mr. Wisor was born in Dublin, Va., and attended the Virginia Polytechnic Institute, Blacksburg, Va., from which he was graduated in 1906. For the next four years he was chemist and assistant chief chemist at the Duquesne works, Carnegie Steel Co. In 1910 he became metallurgist for the Panama Canal Commission, and in 1912 went with the Bethlehem Steel Co., serving as chief chemist and engineer of tests from 1912 to 1916, superintendent of blast furnaces from 1916 to 1918, superintendent of the service division, Bethlehem plant, from 1918 to 1919, assistant general manager, Sparrows Point, Md., plant, from 1919 to 1923, and assistant general manager, Cambria plant, Johnstown, Pa., from 1923 to 1925. He went to the Jones & Laughlin company in 1925 as assistant general manager.

KURTH J. PAPKE, sales manager of Durant Mfg. Co., Milwaukee, has resigned to organize K. J. Papke Co., 290 Third Street, Milwaukee, manufacturers' representative, which will handle Durant line of counting and measuring machines in Wisconsin and also represent Precision Thermometer & Instrument Co., Philadelphia; Divine Brothers Co., Utica, N. Y., casters and truck wheels; Universal Engineering Co., Frankenmuth, Mich., drill bushings; Welded Products Mfg. Co., Cudahy, Wis., factory stools, platforms, trucks, and the Wright Machine Co., Worcester, Mass., screw machine products and metal specialties.

ARTHUR KANE, formerly with Giddings & Lewis Machine Tool Co.,

Fond du Lac, Wis., has resigned to take charge, as vice-president, of the newly-organized pattern engineering and service division for Middle Western States of John Ehne & Son Co., Milwaukee, manufacturer of metal and wooden patterns, which has recently increased its capitalization. J. ARTHUR EHNE is president and general manager.

WILLIAM E. CRAWFORD, electrical engineer with the A. O. Smith Corporation, Milwaukee, since 1920, has been elected president of the Engineers Society of Milwaukee. Secretary E. W. RHODE and treasurer WALTER R. MUELLER were reelected. T. CHALKLEY HATTON, consulting engineer and formerly chief engineer of the Milwaukee Sewerage Commission, was elected vice-president, and BRUNO V. NORDBERG, W. D. BLISS and E. H. MACK, directors.

C. F. KELLEY, president, Anaconda Copper Mining Co., has been awarded the gold medal of the Mining and Metallurgical Society of America "for expansion and stabilization of the mining industry."

CHARLES LE GEYT FORTESCUE, chief consulting transmission engineer for the Westinghouse Electric & Mfg. Co., East Pittsburgh, was recently given the honorary degree of Doctor of Laws by Queens University, Kingston, Ont.

EDWARD B. NEWILL has resigned as manager of the control engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, to become associated in an executive capacity with the radio manufacturing company, which is being formed jointly by the General Motors Corporation and the Radio Corporation of America. Mr. Newill entered upon his new position Oct. 16, with the title of assistant to the president of the Delco Products Co., and will have headquarters temporarily at Dayton, Ohio. When the organization of the new radio company is completed Mr. Newill will be assigned executive duties in connection with either engineering or manufacturing. He was graduated from the Georgia School of Technology, Atlanta, Ga., in 1915, and has been associated with the Westinghouse company since that time.

F. E. FIEGER, assistant general manager, Jones & Laughlin Steel Corporation, Pittsburgh, has been appointed general manager, succeeding R. J. WYSOR, who has resigned as noted elsewhere in these columns. Mr. Fieger went with the Jones & Laughlin company in 1917 as superintendent of the wire department, Aliquippa works, and the next year was made superintendent of steel works. He was made assistant superintendent at



F. E. FIEGER

Aliquippa in 1920, general superintendent of that plant in 1923 and assistant general manager of the company in January, 1928. J. Z. COLLIER and J. G. WEST, JR., have been appointed assistant general managers. Mr. Collier was formerly general superintendent, Aliquippa works, and Mr. West, general superintendent, North Side works, Pittsburgh. C. M. WHITE, who has been assistant to Mr. Collier, succeeds him at Aliquippa, and HARRY SAXER, superintendent of blast furnaces and coke works at that plant, becomes assistant general superintendent at the Aliquippa works. S. S. MARSHALL, JR., general superintendent, South Side works, Pittsburgh, has been made general superintendent of all Pittsburgh plants. H. D. STARK continues as assistant general superintendent in charge of South Side works, and J. C. MURRAY, who has been superintendent of the Eliza blast furnaces, becomes assistant general superintendent in charge of North Side works.

Round Table on Test Data Presentation

In any systematic investigation into the properties of materials—or, in fact, in any extended series of experiments—it becomes a problem to appraise properly the mass of numerical data accumulated. Methods of presentation of such test data will be discussed in a round table conference in New York during the first week in December, held by a committee of the American Society for Testing Materials in conjunction with the annual meeting of the American Society of Mechanical Engineers. The discussion will be open to all those interested.

R. E. Hess, 1315 Spruce Street, Philadelphia, is in charge of preliminary arrangements for holding this conference.

OBITUARY

FRANCIS A. J. FITZGERALD, past-president of the American Electrochemical Society, died of pneumonia on Oct. 27 at his home in Niagara Falls, Ont., aged 59 years. He was born in Dublin, Ireland, and came to



F. A. J. FITZGERALD

America in 1893. He was a graduate of Massachusetts Institute of Technology, was one of the founders of the Acheson Graphite Co., and for many years conducted the Fitzgerald Laboratories in Niagara Falls.

WILLIAM J. STOOP, for 35 years prominently identified with the iron and steel industry in Pittsburgh and nearby districts and most recently general manager of the Morgan Engineering Co., Alliance, Ohio, died on Oct. 3 at his home in Pittsburgh, following a long illness. He began his business career with the Mackintosh-Hemphill Co., Pittsburgh, of which he later became general superintendent. He then went with the Mesta Machine Co. Homestead, Pa., in a similar capacity. He was next associated with the Portsmouth Steel Co., Portsmouth, Ohio, which later became a part of the Whitaker-Glessner Co., and served for several years as general superintendent of that plant. When the company was merged with others to form the Wheeling Steel Corporation, Mr. Stoop went to Wheeling, W. Va., as vice-president and chief of construction. Upon leaving that company about three years ago he was made general manager of the Morgan Engineering Co., having held that position until November, 1928, when he retired on account of ill health.

RICHARD H. TYNER, president, National Marking Machine Co., Cincinnati, died suddenly on Oct. 24, aged 61 years. He helped found the company in 1911.

ERNEST F. HARDER, assistant to the vice-president Westinghouse Electric & Mfg. Co., Newark, N. J., works, died at his home in East Orange, N. J., on Oct. 13. He was born in Germany in 1858 and came to the United States 25 years later.

EDWARD PAYSON BAIRD, president of the Baird Lock Co., Chicago, died on Oct. 24. He had been engaged in the clock and lock manufacturing business for 50 years. He went to Chicago in 1893 and in 1900 established the Baird Mfg. Co., and in 1915 the Chicago Cabinet Lock Co.

GEORGE ROW, managing director and secretary of the Upper Forest & Worcester Steel & Tinplate Works, Ltd., Morriston, Swansea, Wales, died Oct. 25, aged 75 years. He was one of the founders of the Welsh Plate and Sheet Manufacturers Association and had been a member of the Iron and Steel Institute (British) since 1910.

Nine-Month Record in By-Product Coke

WASHINGTON, Oct. 28.—Although the daily output of by-product coke, like that of pig iron, declined somewhat from the unusually high level maintained in August, it fell only slightly short of the high record established earlier in the year, according to the Bureau of Mines. The total output of by-product coke for the 30 days of September amounted to 4,413,011 tons, an average of 147,100 tons a day. In comparison with the daily average of 149,767 in the previous month, this was a decrease of 1.8 per cent. The decrease, however, was confined to the furnace plants, for at the merchant ovens the daily output increased slightly.

There were 86 by-product plants in operation during the month and they produced 92 per cent of their capacity. Beehive coke production for September was estimated at 504,300 tons, a decrease of 10.2 per cent from the preceding month. The combined output of both kinds of coke was 4,917,311 tons.

A new high record was set by both the coke and pig iron industries during the first nine months of this year. The output of by-product coke was 40,363,248 tons and of beehive coke, 4,786,600 tons, a total of 45,149,848 tons; while the production of pig iron was 32,648,371 tons. The nearest approach to the current production was in 1923, when the nine-month output of coke amounted to 44,205,000 tons and that of pig iron to 31,094,873 tons.

Stocks of by-product coke on hand at producers' plants at the end of September amounted to 2,201,508

tons, an increase of 4.8 per cent from Aug. 31. The furnace plants, with 932,264 tons, showed an addition of 46,520 tons. The merchant plants, with 1,269,244 tons, added 54,870 tons during September.

August Immigration Above That in July

WASHINGTON, Oct. 28.—Making an increase of 2710 over July, 22,778 immigrant aliens were admitted to the United States in August, according to the Bureau of Immigration. Females (11,932) outnumbered males (10,846) among the immigrants admitted in August. Europe provided 11,879 of the immigrants, Germany leading with 2301, followed by Italy with 2030. Great Britain was third with 1906, while 1551 came from the Irish Free State.

While more newcomers now come directly from Germany than from Great Britain, fewer immigrants from all countries were charged to the former's quota than to the latter's. This is due to a number of natives of Great Britain entering the United States by way of the northern land border, who give Canada as their last permanent residence.

During August 3156 immigrants charged to the quota for Great Britain and Northern Ireland were admitted to the United States; and of this number 1263 or 40 per cent came in over the Canadian border. In the same month, 2332 immigrants charged to the quota for Germany were admitted, more than 96 per cent of whom came directly from overseas. Of the 29,294 aliens departing from the United States, 5571 left permanently.

Chicago Employment Gain

Most of the industrial groups reporting on employment in the seventh Federal Reserve District showed a larger volume on Sept. 15 than a month earlier, according to a recent report of the Federal Reserve Bank of Chicago. The aggregate gain amounted to 0.7 per cent—the same rate of increase as reported for the preceding period. Workers in the metals and metal products, other than vehicles, increased 0.1 per cent, while employment in vehicle manufacturing plants decreased 0.6 per cent.

Although the volume of employment has been maintained at a satisfactory level, payroll amounts at industrial plants reflect a less favorable condition. All but one of the reporting industries showed a decrease in payroll totals from the preceding month.

September shipments of enameled sanitary ware totaled 314,862 pieces, against 395,542 pieces in August, according to reports received by the Department of Commerce from 22 manufacturers, comprising practically the entire industry.

Exports of Iron and Steel Lower

Despite Drop in September, Nine-Month Total Was Highest Since 1920—Imports of Finished Steel Off 20 Per Cent

WASHINGTON, Oct. 25.—Exports of iron and steel products in September were 222,408 gross tons, the lowest since last December, with a total of 221,810 tons, and 20,448 tons under the 242,856 tons exported in August, the previous low mark of the current year. Imports also declined in September, amounting to 60,974 tons, the smallest since last April, with a total of 54,337 tons, and 22,995 tons under August imports of 83,969 tons.

The sharpest decline in exports in September was in scrap, which dropped to 32,803 tons from 62,857 tons in August. Scrap was the largest item of exportation during each of the two months. Exports of black steel sheets in September decreased to 11,822 tons from 15,890 tons. Tin plate exports declined to 19,910 tons

from 21,367 tons; fabricated material to 10,170 tons from 12,926 tons and steel rails to 10,070 tons from 12,926 tons.

Among the increases were those in steel bars, which rose to 16,999 tons from 11,936 tons; galvanized sheets, to 13,454 tons from 11,336 tons; plain structural material, to 21,187 tons from 5278 tons, the sharpest gain made, and black and galvanized pipe, which rose to 13,482 tons from 11,497 tons.

Only three items in the import list showed gains and all of them were light. As in the case of exports, the largest drop was in scrap, which fell to 6399 tons from 12,033 tons. The next to largest decline was in cast iron pipe, which decreased to 3478 tons from 8397 tons. Little change

was reflected in the incoming movement of structural shapes, the September figure being 15,525 tons as against 15,695 tons for August. Pig iron imports decreased to 11,013 tons from 12,377 tons.

For the nine months ended with September exports totaled 2,327,635 tons, an increase of 201,573 tons over those for the corresponding period of last year, and the largest total for nine months since the abnormal movement in 1920. Imports showed a downward trend, decreasing 15,410 tons to 574,166 tons from 589,576 tons.

Of the September scrap exports, 10,891 tons went to Japan; 9961 tons to Canada; 7532 tons to Italy, and 3000 tons to Poland.

Canada was the sole buyer of 12,136 tons of skelp in September, and took

Exports of Iron and Steel from the United States

(In Gross Ton)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Pig iron	1,806	10,228	42,624	52,559
Ferromanganese	98	1,253	1,355	8,292
Scrap	32,803	58,511	392,398	424,112
<i>Pig iron, ferroalloys and scrap</i>	<i>34,707</i>	<i>69,992</i>	<i>436,377</i>	<i>484,963</i>
Ingots, blooms, billets...	2,450	2,761	32,144	19,110
Skelp	12,136	14,298	94,869	87,225
Wire rods	2,247	3,324	34,098	29,111
<i>Semi-finished steel</i>	<i>16,833</i>	<i>20,383</i>	<i>161,111</i>	<i>155,446</i>
Steel bars	16,999	11,785	158,738	108,865
Alloy steel bars	395	1,282	12,791	11,107
Iron bars	192	453	3,231	2,947
Plates, iron and steel....	12,868	10,989	153,763	109,562
Sheets, galvanized	13,454	8,701	125,364	112,748
Sheets, black steel	11,822	12,038	138,734	140,518
Sheets, black iron	1,313	1,285	12,050	11,425
Hoops, bands, strip steel...	4,509	4,249	56,886	42,054
Tin plate;terne plate....	19,910	16,471	194,273	185,472
Structural shapes, plain material	21,187	13,377	202,277	132,116
Structural material, fabricated	10,170	4,272	87,880	65,405
Steel rails	10,070	16,466	118,561	160,668
Rail fastenings, switches, frogs, etc.	1,704	1,518	24,704	34,277
Boiler tubes	1,761	1,729	14,451	13,116
Casing and oil line pipe...	6,540	6,721	95,845	86,517
Black and galvanized welded pipe	13,482	7,578	108,643	86,389
Malleable iron screwed pipe fittings	784	936	8,978	7,316
Plain wire	3,347	3,056	36,069	33,859
Barbed wire and woven wire fencing	5,548	4,634	50,932	54,091
Wire cloth and screening	156	101	1,341	1,401
Wire rope	437	378	5,671	3,851
Wire nails	812	791	10,756	11,728
Other nails and tacks...	838	460	8,092	7,309
Horseshoes	35	34	287	340
Bolts, nuts, rivets and washers, except track..	1,483	916	12,431	9,716
<i>Rolled and finished steel</i>	<i>159,817</i>	<i>150,220</i>	<i>1,642,748</i>	<i>1,432,797</i>
Cast iron pipe and fittings	6,993	2,171	29,672	25,019
Car wheels and axles....	1,250	2,345	16,466	12,391
Iron castings	582	545	9,004	8,901
Steel castings	671	379	8,804	7,223
Forgings	483	770	9,699	8,228
<i>Castings and forgings...</i>	<i>9,979</i>	<i>6,210</i>	<i>73,645</i>	<i>61,762</i>
All other	1,072	1,193	13,754	11,094
Total	222,408	227,998	2,327,635	2,126,062

Imports of Iron and Steel into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Pig iron	11,013	10,437	103,594	104,777
Ferromanganese*	2,525	4,660	48,818	34,677
Ferrochrome†	48	79	522	569
Ferrosilicon‡	966	123	7,306	2,582
Scrap	6,399	5,727	70,806	37,653
<i>Pig iron, ferroalloys and scrap</i>	<i>20,951</i>	<i>21,026</i>	<i>231,046</i>	<i>180,258</i>
Steel ingots, blooms, billets and slabs	2,360	2,193	20,901	16,619
Wire rods	1,401	1,076	12,608	12,130
<i>Semi-finished steel</i>	<i>3,761</i>	<i>3,269</i>	<i>33,509</i>	<i>28,749</i>
Rails and splice bars....	258	891	5,902	12,982
Structural shapes	15,525	12,207	118,574	131,325
Boiler and other plates...	215	606	3,033	4,668
Sheets and saw plates...	2,771	2,347	19,109	19,912
Steel bars	3,693	7,355	28,952	70,966
Bar iron	161	161	2,446	1,614
Hoops, bands and cotton ties	5,580	9,911	34,253	39,840
Tubular products (wrot.)	2,470	3,084	30,584	31,513
Nails, tacks, staples....	857	1,365	7,190	7,122
Tin plate	29	34	237	817
Bolts, nuts, rivets and washers	47	16	274	176
Round iron and steel wire	551	378	4,629	3,230
Barbed wire	217	762	4,486	3,121
Flat wire: strip steel....	199	217	1,663	1,780
Steel telegraph and telephone wire	11	.....	14	168
Wire rope and strand....	93	98	1,779	1,255
Other wire	17	78	402	451
<i>Rolled and finished steel</i>	<i>32,694</i>	<i>39,513</i>	<i>263,527</i>	<i>330,940</i>
Cast iron pipe	3,478	1,778	44,532	47,314
Castings and forgings...	90	163	1,552	2,315
Total	60,974	65,749	574,166	589,576
Manganese ore*	13,123	15,063	260,168	146,657
Iron ore	246,917	211,494	2,314,124	1,887,201
Magnesite	12,292	.....	31,915	38,391

*Manganese content only.

†Chromium content only.

‡Silicon content only.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS (In Gross Tons)

	September	August	July
Austria	17	28	50
Azores, Madeira		2	
Belgium	13,238	18,131	15,497
Bulgaria			170
Czechoslovakia	98	95	
France	8,756	11,423	13,556
Germany	10,933	14,225	13,163
Italy	345	367	217
Netherlands	791	908	837
Norway	460	4,874	1,668
Sweden	3,063	3,140	3,491
Switzerland	19		40
United Kingdom	3,791	6,725	4,034
Europe	41,511	59,920	52,723
Canada	12,917	16,648	13,305
Mexico	30	109	33
Cuba			195
Dominican Rep.	24		
British India	6,485	7,227	5,120
Japan	7	30	2
Canary Islands		30	
Miscellaneous		7	
Total	60,974	83,969	71,378

3566 tons of the 6540 tons of casing and oil line pipe exported. Of the 9910 tons of welded black pipe exported in September, 1793 tons went to Japan; 1315 tons to Canada; 1214 tons to the United Kingdom, and 777 tons to Mexico.

Total exports to Canada in September were 87,608 tons, while 29,117 tons went to Japan, 11,581 tons to the

Further Reduction in Iron Ore Imports

September imports of iron ore are reported by the Department of Commerce at 246,917 gross tons, a drop of 17 per cent from the 298,013 tons of August. The current figure is, however, 17 per cent higher than the 211,494 tons of September, 1928. The August total was the third largest in more than six years.

In the elapsed portion of the year an increase over last year is shown of 427,000 tons, which represents 22.5 per cent. This makes the year, so far, the heaviest in our history, as it has exceeded the previous high record, made in 1923, by a fraction of 1 per cent. The 1923 total in nine months was 2,297,144 tons, which now is bettered by 17,000 tons.

Chile continues to supply the largest share of the imports, which, however, dropped in September for the first time in some months to a little less than one-half the total. For the nine months, however, Chile's proportion was about 52 per cent. Cuba, Sweden, French Africa and Spain followed in that order, both for September and for the nine months. This is somewhat different from the line-

Philippine Islands, and 8922 tons to Mexico.

Of the structural shapes imported in September, 8183 tons came from Belgium, 3876 tons from Germany, and 3158 tons from France. France provided 3222 tons of the September cast iron pipe imports. Of the 2470 tons of "other pipe" imported during that month, 836 tons came from Germany, 691 tons from Canada, 542 tons from the United Kingdom, and 382 tons from Sweden. Sweden was the largest source of incoming shipments of steel bars in September, furnishing 1313 tons, while 1116 tons came from Belgium, 695 tons from France, and 324 tons from Germany.

Canada led as the source of supply of ferromanganese imports, providing 1968 tons out of the total of 2525 tons, while 312 tons came from the United Kingdom. Of the 13,123 tons of manganese ore concentrates imported in September, 7200 tons came from Soviet Russia, 2600 tons from India, 2439 tons from the Gold Coast of Africa, and 839 tons from Brazil.

Belgium was the greatest source of imports in September, supplying a total of 13,238 tons, while Canada was a close second, with 12,917 tons. Germany furnished 10,933 tons, and France, 8756 tons.

up of a year ago, when Sweden supplied no ore during the month and a low amount in the nine months, owing to an extensive strike in the Swedish mines.

To Air Steel Window Trade Practices

WASHINGTON, Oct. 28. — Commissioner Charles H. March of the Federal Trade Commission will preside at a trade practice conference which has been authorized for the solid-section steel window industry, the time and place of which have not been scheduled.

Applicants for the conference, according to the commission, represent 100 per cent of the manufacturers of solid-section steel windows east of the Rocky Mountains. Several manufacturers on the Pacific Coast have not yet indicated a desire to take part.

Among practices proposed for discussion are: Publication of prices, proper handling of commodity and engineering sales, inducing breach of contract, misbranding and misrepresentation, secret rebates, dumping and making less-than-carload sales at carload prices.

Thomas Process Jubilee by British Steel Company

Bolckow, Vaughan & Co., Middlesbrough, England, have issued a booklet in commemoration of the fiftieth anniversary of the successful completion of a series of experiments at their Cleveland steel works by Sydney Gilchrist Thomas and Percy Carlyle Gilchrist. These experiments, which resulted in the development of the basic-Bessemer process of steel-making, were revolutionary and have affected the industry ever since.

The story of the two inventors is one of difficulty and poverty. Thomas was to be a physician, but his father's death when he was only 17 years old made such a career impossible. He became assistant master at a private school in Essex, and then a junior clerk in the metropolitan police courts. His salary was £90 (\$450) a year, and he remained in that position for 12 years. Probably few suspected that the young police court clerk had inventive ability.

A chance phrase about the Bessemer converter heard at a Birkbeck Institute lecture when he was 20 fired his imagination. He attended classes in mineralogy, and after a little while enlisted the help of his cousin, Gilchrist, who was a chemist at a South Wales works. Out of his small salary as a clerk, Thomas managed to save £800 (\$4,000). This the two men spent on research, and finally patented their process. The results were embodied in a paper which came to the notice of the manager of Bolckow, Vaughan & Co., with the result that the new process was given a trial. The revolution of steel manufacture was thus begun. Thomas did not live long to enjoy the fruits of his success, for he died when he was only 35 years old.

Canton Rolling Mills to Make Coated Alloy Sheets

The Canton Rolling Mills Corporation, Canton, Ohio, which some months ago bought the plant of the Falcon Tin Plate Co., announces that the mill is now being electrified and new equipment, including continuous heating furnaces and Streine automatic shearing equipment, is being installed. The mill is being changed over from tin plate and black plate sizes so that it will roll full finished and coated alloy sheets up to 48-in. wide and 168-in. long. Officers of the company are: President, Alvin L. Bear; secretary-treasurer, Godfrey M. Cohn; vice-president, Charles M. Easterly. In addition to the above, the directors are: William H. Lotts, Milo C. Hagen, Theodore E. Rein and William T. Martersteck. Mr. Martersteck is plant engineer and works manager.

The Internal Revenue Bureau has announced the refund of an income and profits tax of \$294,141 to the Youngstown Sheet & Tube Co.

SOURCES OF AMERICAN IMPORTS OF IRON ORE (In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Chile	114,930	130,800	1,198,553	1,079,100
Cuba	47,000	31,000	486,350	265,786
Spain	6,028	5,461	44,259	22,208
Sweden	28,463		238,830	19,614
French Africa	13,320	27,525	141,795	362,130
Canada	43	167	3,403	45,359
Other countries	37,133	16,541	200,934	93,004
Total	246,917	211,494	2,314,124	1,887,201

Machinery Exports Decline Further

But Nine-Month Total Is Nearly \$100,000,000 Above Previous High Record—Imports Up in Nine Months

WASHINGTON, Oct. 25.—Continuing their downward trend, exports of machinery of all kinds declined to a value of \$46,984,546 in September from \$50,178,881 in August, a drop of \$3,194,335, or 6.2 per cent. For the nine months ended with September, however, exports of machinery were valued at \$462,554,128, against \$365,342,219 for the corresponding period of last year, an increase of \$97,211,909, or 26.9 per cent. When compared with September, 1928, with a value of \$33,457,410, exports last month showed a gain of \$13,527,136, or 40 per cent.

For the third quarter a total of \$154,139,000 was made, second only to the \$155,939,000 in the first quarter of this year and far higher than in any quarter of any preceding year. The nine-month total is a new record, exceeding the previous high, that of 1928, as above.

Exports of machinery and vehicles in September were valued at \$85,314,

591, against \$90,453,070 in August, a decline of \$5,138,479, but an increase of \$16,666,796 over similar exports of \$68,647,795 in September of last year. For the nine months ended with September exports of machinery and vehicles were valued at \$955,120,919, an increase of \$188,356,938 over similar exports (\$766,782,012) for the corresponding period of 1928.

Exports in September of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at \$23,248,731, a slight increase over those in August, valued at \$23,154,869, and a gain of \$8,532,413 over similar exports in September of last year. For the nine months ended with September industrial machinery exports were valued at \$210,291,813, compared with \$163,026,202 for the corresponding period of last year, an increase of \$47,265,611, or 29 per cent.

Exports of power-driven metal-working machinery, as listed in THE

IRON AGE table, numbered 944 units, valued at \$1,595,716, in September, against 894 units, valued at \$1,342,908, in August.

Nine-Month Imports Show Sharp Gain

Imports of machinery and vehicles in September were valued at \$3,115,744, against \$3,493,152 in August, a decline of \$377,408. Compared with \$2,226,411 in September of last year, there was a gain of \$889,333. For the nine months ended with September imports of machinery and vehicles were valued at \$32,505,207, compared with \$21,194,772, reflecting the sharp gain of \$11,310,435, or 53.4 per cent. Imports of industrial, office and printing machinery in September were valued at \$1,985,300, an increase of \$98,420 over those in August, valued at \$1,886,880, and a gain of \$540,630 over similar imports for September of last year, valued at \$1,444,670. For the first nine months of 1929, imports of industrial, office

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Locomotives	\$470	\$555	\$3,032	\$2,548
Other steam engines.....	55	26	598	707
Boilers	150	194	1,463	995
Accessories and parts.....	60	39	710	463
Automobile engines	625	919	9,461	11,511
Other internal combustion engines	1,021	712	7,723	6,577
Accessories and parts.....	274	215	3,377	2,740
Electric locomotives	46	16	308	1,128
Other electric machinery and apparatus	1,148	507	10,028	5,824
Excavating machinery	538	291	6,335	2,242
Concrete mixers	151	68	1,154	795
Road-making machinery....	201	210	2,431	2,245
Elevators and elevator machinery	623	266	4,070	3,208
Mining and quarrying machinery	1,809	1,014	13,459	10,116
Oil-well machinery	1,878	872	18,882	10,891
Pumps	835	520	8,798	5,916
Bending and power presses	272	363	2,610	1,732
Forging machines	86	73	1,113	610
Machine tools*	2,341	832	21,336	12,219
Other metal-working machinery and parts.....	592	383	5,696	4,494
Textile machinery	1,035	756	9,915	9,733
Sewing machines	951	495	7,918	6,387
Shoe machinery	147	95	1,503	1,339
Flour-mill and Gristmill machinery	120	317	500	334
Sugar-mill machinery	770	510	3,194	3,295
Paper and pulp-mill machinery	394	158	2,941	2,244
Sawmill machinery	72	48	68	672
Other woodworking machinery	192	115	1,785	1,389
Refrigerating and ice-making machinery	1,000	659	11,578	7,083
Air compressors	646	401	587	5,008
Typewriters	1,649	1,363	17,894	15,660
Power laundry machinery	73	122	1,505	877
Typesetting machines	588	347	4,547	3,371
Printing presses	369	374	5,163	4,453
Agricultural machinery and implements	9,250	8,498	109,721	90,182
All other machinery and parts	16,554	11,124	161,151	126,354
Total	\$46,985	\$33,457	\$462,554	\$365,342

*Principal details in another table.

Imports of Machinery into the United States

(By Value)

	September		Nine Months Ended September	
	1929	1928	1929	1928
Metal-working machine tools.....	\$95,200	\$35,516	\$904,410	\$433,247
Agricultural machinery and implements	502,507	245,791	7,460,388	3,751,852
Electrical machinery and apparatus	232,302	255,520	2,131,267	1,897,683
Other power-generating machinery	87,063	48,376	957,061	538,073
Other machinery	829,301	780,238	9,059,672	7,270,990
Vehicles except agricultural	392,535	280,430	4,260,727	2,323,625
Total	\$2,138,908	\$1,645,871	\$24,773,525	\$16,215,470

Exports of Power-Driven Metal-Working Machinery

	September, 1929		August, 1929	
	No.	Value	No.	Value
Engine lathes.....	86	\$210,856	59	\$139,664
Turret lathes	47	140,537	23	55,169
Other lathes	110	193,492	89	177,632
Vertical boring mills and chucking machines	11	19,974	13	25,505
Thread-cutting and automatic screw machines..	80	99,179	89	121,082
Knee and column-type milling machines	53	141,800	54	111,596
Other milling machines..	60	173,097	42	94,321
Gear-cutting machines...	32	125,234	31	93,792
Vertical drilling machines	39	49,465	45	43,863
Radial drilling machines.	7	21,798	9	23,221
Other drilling machines..	155	44,620	192	57,672
Planers and shapers....	53	64,595	47	96,473
External cylindrical grinding machines	89	185,962	60	150,444
Internal grinding machines	37	100,482	33	103,125
Metal-working tool-sharpening machines.....	85	34,625	108	49,349
Total	944	\$1,595,716	894	\$1,342,908

and printing machinery were valued at \$18,648,152, representing the high increase of \$5,426,540, or 24.4 per cent over similar imports for the corresponding period of last year.

Imports of machinery, as listed in THE IRON AGE table, were valued at \$2,138,908 in September, compared with \$2,602,309 in August, a decrease of \$463,401, but an increase of \$493,-

037 over similar imports in September of last year. For the first nine months of 1929 they were valued at \$24,773,525, an increase of \$8,558,055, over the same period of last year.

Where Steel Exports Went in Nine Months

Canada Took 550,679 Tons of Nine Leading Items—Japan Retains Second Position with 115,654 Tons, Followed by Argentina, 41,392 Tons; Philippines, 38,370 Tons; Mexico, 35,027 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	September—		Nine Months		September—		Nine Months		September—		Nine Months	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	12,868	19,989	153,763	169,562	13,454	8,701	125,364	112,748	11,822	12,038	137,734	140,518
Canada	19,589	9,034	129,950	91,730	1,611	2,449	26,282	24,922	5,391	6,694	74,165	63,494
Japan	151	91	2,625	1,442	316	599	2,434	2,432	1,556	2,137	20,588	55,628
Cuba	52	56	947	894	712	254	4,603	4,230	122	33	1,082	1,622
Philippine Islands	95	179	1,455	1,974	2,748	531	21,024	17,066	20	326	2,483	2,374
Mexico	27	71	379	589	2,180	675	10,704	6,273	171	198	2,447	1,932
Argentina	.....	.....	.....	.....	433	370	4,874	5,418	754	29	5,041	1,221
Chile	.....	.....	.....	.....	.....	.....	.....	.....	8	1,483	3,437	1,786
Colombia	.....	.....	.....	.....	291	546	4,082	1,414	25	.....	368	315
	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	September—		Nine Months		September—		Nine Months		September—		Nine Months	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	10,070	16,466	118,561	160,668	5,548	4,634	50,932	54,091	3,347	3,056	36,079	34,859
Canada	1,842	4,548	20,141	22,434	245	78	2,070	2,876	390	1,131	10,030	11,411
Japan	2,117	3,190	9,134	14,255	.....	.....	.....	.....	91	114	1,097	1,286
Cuba	686	.....	6,594	2,396	602	462	2,493	3,868	96	67	900	798
Philippine Islands	97	292	7,865	3,332	834	118	5,198	1,534	26	11	545	219
Mexico	719	276	5,672	5,429	639	230	5,223	4,998	149	84	1,809	1,749
Argentina	.....	.....	3,740	3,012	745	1,636	5,995	11,830	815	889	6,125	7,361
Chile	116	121	15,625	21,613	.....	.....	.....	.....	96	55	.....	.....
Colombia	96	66	4,043	9,989	210	.....	4,840	3,282	.....	.....	.....	.....
Brazil	1,623	.....	9,174	18,290	664	392	.....	11,474	153	51	1,068	911
	Tin Plate				Steel Bars				Heavy Plain Structural Material			
	September—		Nine Months		September—		Nine Months		September—		Nine Months	
	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928
Totals	19,910	16,471	194,273	185,472	16,999	11,785	158,738	108,865	21,187	13,377	202,277	132,116
Canada	4,337	4,344	36,468	38,107	6,350	9,392	78,892	71,737	17,294	10,661	172,681	109,345
Japan	3,566	6,888	45,254	42,403	3,490	82	25,633	808	1,904	31	8,889	1,550
Cuba	225	238	4,339	3,259	294	215	3,497	3,783	142	711	1,928	4,539
Mexico	859	761	6,880	9,335	219	63	1,183	574	135	127	739	804
Argentina	1,593	386	13,728	15,677	.....	.....	.....	.....	28	49	1,889	332
Chile	220	426	3,531	2,924	.....	.....	.....	.....	.....	.....	.....	2,842
Brazil	176	227	10,777	4,898	.....	.....	.....	.....	.....	.....	.....	.....
China	4,537	798	21,805	13,475	.....	.....	.....	.....	.....	.....	.....	.....
British India	347	.....	4,061	3,491	.....	.....	.....	.....	.....	.....	.....	.....
United Kingdom	.....	.....	844	.....	3,029	1,942	18,777	12,957	.....	.....	.....	.....
Italy	203	.....	5,149	3,950	.....	.....	.....	.....	.....	.....	.....	.....

Destination of Iron and Steel Exports, September, 1929

(In Gross Tons)

Country of Destination	September, 1929	January Through September		Country of Destination	September, 1929	January Through September	
	1929	1929	1928		1929	1929	1928
North and Central America and West Indies	111,433	1,178,757	1,027,606	Italy	7,888	93,472	81,613
Canada and Newfoundland	88,107	968,821	857,961	Netherlands	382	2,408	1,703
Cuba	5,939	52,586	47,251	Poland and Danzig	3,002	75,081	53,718
Guatemala	481	5,693	6,418	Rumania	649	3,419	3,646
Honduras	364	8,020	4,917	Soviet Russia	2,249	7,635	2,601
Mexico	8,922	77,871	61,162	United Kingdom	7,825	51,798	39,074
Panama	2,864	15,732	11,705	Other Europe	1,729	25,151	14,940
Salvador	127	3,454	2,670	Far East	56,014	538,952	532,732
British West Indies	1,288	15,008	5,919	British Malaya	490	7,550	5,454
Other West Indies	2,793	22,252	22,705	China	6,356	57,070	76,886
Other Central America	638	7,320	6,898	Netherlands East Indies	3,544	51,360	30,450
South America	27,446	297,589	321,150	India and Ceylon	1,004	15,013	18,657
Argentina	6,145	71,504	72,162	Japan	29,117	287,767	302,399
Brazil	6,240	52,655	60,553	Kwaptung	566	9,282	12,356
Chile	2,898	44,209	52,761	Philippine Islands	11,581	76,908	64,625
Colombia	2,424	33,372	49,068	Australia	1,348	17,413	12,243
Peru	6,949	29,955	19,151	New Zealand	736	3,691	1,801
Uruguay	372	6,560	6,762	Other Asia and Far East	1,272	12,898	7,861
Venezuela	2,042	54,924	56,916	Africa	2,183	17,118	10,189
Other South America	376	4,410	3,777	Union of South Africa	813	6,760	4,401
Europe	25,332	295,219	234,385	Egypt	444	6,288	3,430
Belgium	303	2,320	12,175	Mozambique	892	2,656	1,006
France	1,059	15,829	3,825	Other Africa	34	1,414	1,352
Germany	246	18,106	21,090	Total	222,408	2,327,635	2,126,062

European Steel Markets Less Active

Forward Business Slower and Exports Fall—Reduced Output in Germany—Turkey to Make Steel

(By Cable)

LONDON, ENGLAND, Oct. 28.

WHILE Cleveland furnaces are satisfactorily engaged for the next few weeks, forward business is not developing very well and producers are somewhat pessimistic, as costs are not decreasing and lower pig iron prices are impracticable at present.

Continental material is being offered in restricted quantities, but consumers are cautious in buying. Hematite iron is moderately active, but furnaces are not pressing for business, asserting that the price should be fully £4 (\$19.40) a ton. As a result, some pig iron is now going into stock.

Domestic business in finished steel has increased slightly, but export is still generally quiet. Foreign competition abroad is hampering expansion, but British makers are unable to reduce prices and in some cases are considering advances.

Tin plate is active, but prices are easier, as tin has declined in price. Mills are well booked for several months and export markets are inquiring for considerable tin plate. An Eastern oil can tin plate order for about 1,000,000 boxes is expected to be placed here at an early date.

Galvanized sheets are quiet and prices have declined further based on low priced foreign steel. Spelter makers are meeting Friday to discuss

the market situation. Black sheets continue inactive.

The Continental market is disorganized by lack of buying and continually receding prices and makers are meeting today to discuss the question of stabilization through a central sales office.

Belgian production in September was 347,000 metric tons of pig iron, 337,000 tons of raw steel and 288,000 tons of rolled steel products. On Sept. 30, 57 furnaces were in blast.

German output in September was 1,230,000 metric tons of raw steel and 906,000 tons of rolled steel products. Luxemburg production in September was 240,000 metric tons of pig iron and 223,000 tons of raw steel.

steel production and supply the same markets, so that the merger offers both considerable benefit. Directors of the companies have recommended acceptance of the agreement.

When the merger is completed the new corporation will have a share capital stock of £11,248,146 (\$54,553,508) and debenture stock of £5,855,773 (\$28,400,499). The permanent name of the merged companies will be Dorman, Long & Co., Ltd., but for a time it will appear with the phrase, "incorporating Bolckow, Vaughan & Co., Ltd."

British Light Their Largest Coke Oven

LONDON, ENGLAND, Oct. 19.—The largest coke oven in the United Kingdom has been placed in operation at Chapelton, Sheffield, by Thorncliffe Coal Distillation, Ltd. It will use 1200 tons of coal a day and produce 840 tons of coke, 8,000,000 cu. ft. of gas, 12,000 gal. of tar, 17 tons of ammonia sulphate and 3000 gal. of benzol. Half the gas will be conveyed by a six-mile main to the Sheffield Gas Co.

Sir Samuel Roberts, M. P., speaking at the plant when the oven was lighted, said that surplus gas could also be used for generating electricity and that there is a great future for colliery companies which generate electricity on a large scale.

Agreement Reached For British Steel Merger

LONDON, ENGLAND, Oct. 19.—A provisional agreement for the acquisition of assets and liabilities of Bolckow, Vaughan & Co., Ltd., by Dorman, Long & Co., Ltd., has been signed by both parties. Under its terms stockholders of Bolckow, Vaughan & Co. will exchange their shares for securities in Dorman, Long & Co. In the announcement of the provisional agreement it is stated by the companies that they have identical iron, steel and engineering interests, equipment, raw materials and

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12½s. to £3 13½s.	\$17.58 to \$17.82
East Coast hematite...	3 16½ to 3 17	18.51 to 18.63
Ferromanganese, export	13 10 to 14 0	65.47 to 67.90
Billets, open-hearth...	6 5 to 6 7½	30.31 to 30.92
Sheet bars, open-hearth	6 5 to 6 10	30.31 to 31.52
Black sheets, Japanese specifications	12 12½ to 12 13	61.22 to 62.43
Tin plate, per base box	0 18¾ to 0 19	4.54 to 4.60
Rails, 60 lb. and heavier	7 15 to 8 15	37.59 to 42.43
Cents per Lb.		
Steel bars, open-hearth	7 15 to 8 10	1.67 to 1.84
Beams, open-hearth...	7 2½ to 7 12½	1.55 to 1.65
Channels, open-hearth...	7 7½ to 7 17½	1.60 to 1.71
Angles, open-hearth...	8 2½ to 8 12½	1.76 to 1.86
Ship plates, open-hearth	7 12½ to 8 2½	1.66 to 1.76
Black sheets, No. 24 gage	10 0 to 10 5	2.17 to 2.21
Galvanized sheets, No. 24 gage	12 17½ to 13 5	2.78 to 2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 8s. to £3 11½s.	\$16.49 to \$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 8 to 3 10	16.49 to 16.97
Billets, Thomas	4 13 to 4 13½	22.65 to 22.77

Sheet bars, Thomas...	4 11 to 4 12	22.06 to 22.30
Wire rods low C., No. 5 B.W.G.	6 3 to 6 5	29.82 to 30.30
Black sheets, No. 31 gage, Japanese	12 6 to 12 7½	59.65 to 60.02
Rails, 60 lb. and heavier	6 8½ to 6 10*	31.16 to 31.52
Rails, light	6 1½	29.46
Cents per Lb.		
Steel bars, merchant...	5 2 to 5 3	1.10 to 1.11
Steel bars, deformed...	5 1 to 5 2	1.09 to 1.10
Beams, Thomas, British standard	4 17 to 5 3	1.05 to 1.11
Channels, Thomas, American sections	5 14 to 5 18	1.24 to 1.27
Angles, Thomas, 4-in. and larger, over ¾-in. thick	4 19 to 5 6	1.07 to 1.14
Angles, Thomas, 3-in.	5 6	1.14
Ship plates, open-hearth inspected	7 5	1.61
Hoop and strip steel over 6-in. base	5 7½ to 5 10	1.15 to 1.19
Wire, plain, No. 8 gage	7 2½ to 7 3½	1.54 to 1.55
Wire, galvanized, No. 8 gage	8 16	1.89
Wire, barbed, 4-pt. No. 12 B.W.G.	11 3½	2.41
Wire nails, base	7 10 to 7 10½	\$1.62 to \$1.63 per keg
Wire nails, assortments, 1 to 6-in. keg	10 6½	2.23

*Open-hearth steel, 10s. (\$2.42) per ton extra.

German Beryllium Output Increases

Further Price Reduction Expected Soon — Alloyed with Copper It Has Unusual Strength and Elasticity

HAMBURG, GERMANY, Oct. 14.—In recent months the price of beryllium has been reduced to 1000 m. (\$238) per kg., or \$108 per lb., a little more than half the present price in the United States. The reduction was made possible by improvements in production by the Siemens & Halske A. G., the leading German maker. The company is now planning a new beryllium plant with a capacity of 100 kg. a month, and it is expected that the price will be further reduced to 700 or 800 m. (\$167 to \$190) per kg., or \$76 to \$86 per lb.

The Siemens & Halske A. G. is producing beryllium electrolytically by using beryllium double fluoride. The product is 98 per cent Be, 1 per cent Fe and 1 per cent impurities; it is hard but brittle. Beryllium, 99.5 per cent pure, is used for X-ray equipment. Its principal use, however, is as an alloy of steel, aluminum, copper or other metals. The chief alloy being produced in Germany today is copper-beryllium with 2.50 per cent Be. It is claimed by its makers to have six times the hardness and five times the fatigue resistance of copper, and by proper heat treatment, it is said, these properties can be greatly increased. Beryllium bronze, with

2.50 per cent Be, is claimed by producers to compare favorably with the best chromium spring steel.

An important quality claimed for the beryllium alloys is their extreme elasticity, exceeding that of other elastic metals. Tests are said to show that beryllium bronze springs will withstand two to three times the use of high-quality steel springs without showing fatigue. Flat springs of beryllium-bronze have been tested up to 15,000,000 vibrations without breaking, it is stated. Beryllium bronze springs are claimed to have shown under test that they are four and a half times stronger than brass springs and two and a half times stronger than nickel steel or phosphor bronze springs. Copper wire alloyed with 2.50 per cent Be is said to have greater electrical conductivity than other non-ferrous metal alloys.

Tests have shown that beryllium alloys can be welded, rolled or drawn into any required shapes, it is reported. Investigation is now being made of beryllium alloyed with nickel and cobalt, and the Friedrich Krupp A. G. is investigating it as an alloy of Nirosa. Beryllium alloys are being used in Germany by the electrical and spring manufacturing industries.

German Export Trade Quiet

Affected by Depression in Other Continental Markets—
Locomotive Builders Report Better Business

BERLIN, GERMANY, Oct. 10.—Steel activity has declined somewhat in the past fortnight, partly in sympathy with the weakness evident in other Continental markets. While the total number of unemployed in Germany is 170,000 more than at the same date in 1928, there has been the usual fall increase in industrial personnel and the surplus of unemployed is considered as a normal result of increasing population.

Production continues high. Coal output in the first eight months of this year was 107,300,000 metric tons, 6,000,000 tons more than in the same period of 1928. Pig iron production in the first nine months of this year was 10,049,048 tons, compared with 9,638,384 tons in nine months of last year. The continued high production of iron and steel, despite a weaker market, is believed to be the result of many mills producing for stock rather than to curtail operations and reduce their personnel. Certain mills, however, have begun to curtail, among the leaders being the Friedrich Krupp A. G. and the Gutehoffnungshütte.

Export trade is decidedly inactive and the latest returns, which are for August, show net exports of 355,000

tons of heavy iron and steel. This is larger than the monthly average for 1928 of 219,000 tons, but new business is coming in slowly. The Hamburg Steel Export Association complains that Belgian and French sellers are shading prices, but it is noteworthy that German mills also have reduced export quotations by several shillings a ton in some instances. While there have been some sizeable foreign orders for heavy-gage sheets and the prices have not been reduced, the demand is declining.

The Friedrich Krupp A. G., Essen, reports good business in locomotives and has under construction 75 steam-driven engines, of which 60 are for export to India. In addition the works is building a number of Diesel-driven locomotives. Other locomotive builders also report improved foreign business. Exports of locomotives this year show increased shipments to France, Holland, British South Africa, Denmark, Spain, Bolivia and Colombia. Deliveries to Russia have declined.

While exports of steam boilers for locomotives have declined, shipments of boilers for other purposes show an increase. The total weight of all

boilers shipped in the first seven months of this year was 11,700 tons, compared with 8400 tons in the same period of 1928. Shipments to Russia and the Dutch East Indies and to France on reparations have been better.

The Railroads Corporation is generally limiting its purchases of materials to equipment for replacement only, and the financial condition of municipalities has checked demand for street cars and equipment.

Leading manufacturers of cable have formed a corporation in which all are shareholders. The companies included are C. J. Vogel Draht und Kabelwerke, Deutsche Kabelwerke, Deutsche Telefonwerke und Kabelindustrie, Norddeutsche Kabelwerke, Kabelwerk Rheydt and Hackethal Draht und Kabelwerke of Hanover.

Krupp Builds Brass Foundry in India

HAMBURG, GERMANY, Oct. 14.—The Grusonwerk of the Friedrich Krupp A. G., Essen, is executing a contract for construction and equipment of a brass foundry and rolling mill in Bengal, India. The new plant, the first of its kind in India, will have a rated capacity of 400 to 500 tons a month.

India Buys Car Axles in Belgium

HAMBURG, GERMANY, Oct. 14.—While steel rail prices are controlled by the International Rail Makers' Association, other railroad material prices are decidedly weak. Recently the India Stores Department inquired for several thousand tons of railroad car axles and other material for cars. The British bidder quoted £13 10s. (\$65.47) per ton, f.o.b. port, the German bid was £11 2s. 6d. (\$53.95) per ton, f.o.b. port, a works in the Saar quoted £10 (\$48.50) per ton, f.o.b., and a Belgian maker received the order at £8 (\$38.80) per ton, f.o.b. Antwerp.

Contract Awarded for New Turkish Steel Mill

HAMBURG, GERMANY, Oct. 14.—A contract for the construction and equipment of a new steel plant for the Turkish Government near Angora has been awarded to three German companies. The designs of the buildings and the material will be furnished by the Gutehoffnungslütte A. G., the machinery by DEMAG and the electrical equipment by the Allgemeine Electricitäts Gesellschaft. The cost of the plant, exclusive of the cost of construction, will be about 17,000,000 m. (\$4,046,000). It will be ready for operation by April, 1931, and payment will be made in six annual instalments. Bars, beams, hoops and pig iron will be produced. A wire mill is to be built later. The new

works will use Anatolian iron ore of high quality and will obtain coal from the Eregli mines.

German Steel Works Report Shows Reduced Output

DÜSSELDORF, GERMANY, Oct. 14.—The report of the Vereinigte Stahlwerke A. G. for its fiscal year ended Sept. 30 shows a total production for the 12 months of 6,007,739 metric tons of pig iron, 6,419,796 tons of steel ingots, 27,241,000 tons of coal and 9,604,032 tons of coke. While coal and coke output showed an increase from the previous 12 months, pig iron registered a decline of 500,000 tons and steel of 550,000 tons.

The total number of employees at the end of September was 176,716, and the value of all products sold was 1,433,338,000 m., of which 529,038,000 m. was received from export trade. On this basis exports of the company were 37 per cent of the total business, compared with 31 per cent in the previous year. Orders on books represented a decrease from a year ago, being 81.9 per cent of the total at the end of September, 1928.

Pig Iron Imports Decline in September

Imports of pig iron into the United States in September were 11,013, gross tons, a reduction of about 10 per cent from the August total of 12,377 tons, but more than 5 per cent higher than the incoming shipments of September, 1928.

For the nine elapsed months of the year the incoming shipments, at 103,594 tons, were about 1 per cent higher than a year ago and represented the largest such total since 1926, when about 394,000 tons came in in that period.

British India again supplied the lion's share, with Canada in second position and Netherlands and United Kingdom, which usually are large shippers of pig iron, far below the two leaders. This is in sharp contrast with the situation in September, 1928, when Netherlands stood first, British India second and United Kingdom third, while Canada supplied no pig iron whatever.

In the nine months British India

has taken away from the United Kingdom the leadership which the latter had in 1928. Netherlands stands third in both years.

Canadian Lignite Mines May Buy German Equipment

HAMBURG, GERMANY, Oct. 14.—Manufacturers of mining equipment in Germany are negotiating with the companies in Canada planning to begin operations in the lignite mines in Ontario. Earlier this year the new Australian lignite mines and briquetting plants installed German equipment following inspection of the mines in central Germany.

To Build Russian Ships

HAMBURG, GERMANY, Oct. 14.—The Russian trade delegation at Berlin has placed contracts with German yards for 14 ships, including six coastal vessels placed with the Nordseewerke, controlled by the Vereinigte Stahlwerke A. G., six vessels awarded to the Schichauwerft and two cargo steamers ordered from another German yard. In addition, contracts have been placed for machinery and other equipment for a new aluminum plant to be constructed at Nowosibirsk.

86 Per Cent Adherence to Simplified Schedules

Average adherence to recommendations for 27 simplified practice programs reviewed by the Division of Simplified Practice during the fiscal year 1929 was 86 per cent. The average adherence obtained through 79 surveys made since 1922, when the Department of Commerce, under Herbert Hoover, then its secretary, organized the work, was 83 per cent. The total number of individual firm acceptances to June 30, 1929, amounted to about 20,790.

Fourteen typical industries which have cooperated with the department in establishing simplified practice recommendations estimate their total savings at approximately \$240,000,000, according to the Bureau of Standards.

Large Savings Attributed to Simplified Practice

Industry's own evaluation of the results that have attended its effort to eliminate avoidable waste through adherence to the principles of simplified practice shows that 10 of the 105 active simplified practice recommendations are producing an annual saving of \$300,000,000, Edwin W. Ely, chief, Division of Simplified Practice, Department of Commerce, Washington, said in an address recently before the manufacturers' section of the American Gas Association at Atlantic City.

Uses of Abrasives Depicted in Film

Grinding and polishing operations are pictured in an educational motion picture film, "Manufactured Abrasives," produced by the United States Bureau of Mines, in cooperation with a large industrial concern.

While natural abrasives, such as sandstone, flint and emery, formerly served, modern industry must have harder, sharper and more efficient grinding materials, it is pointed out. This need is largely met by manufactured abrasives such as are made in electric furnaces operated by power generated at Niagara.

Several widely used abrasives are featured. Their utilization in a wide variety of industrial operations is shown in some detail.

Copies of the film may be obtained for exhibition purposes by schools, churches, clubs, civic and business bodies, miners' unions, engineering societies and others interested, by applying to the Pittsburgh Experiment Station of the United States Bureau of Mines, Pittsburgh. No charge is made for the use of the film, but the exhibitor is asked to pay transportation charges.

Manufacture of snow traveling devices for automotive use will be concentrated in the New Holstein, Wis., plant of the Snow Flyer Co., following the purchase by that concern of the plant, patents and other assets of the Snowmobile Mfg. Co., West Ossippi, N. H. The New Hampshire plant will continue in operation throughout the winter busy season before the consolidation of production is finally completed. The New Holstein officers, including A. L. Langenfeld, president, and Paul Langenfeld, secretary-treasurer, will continue in the same capacities in the consolidated company.

The Youngstown Sheet & Tube Co. has contracted with the Semet-Solvay Engineering Corporation, New York, for the installation of equipment for refining light oil and producing motor benzol, toluol and solvent naphtha at its by-product coke oven plant at Indiana Harbor, Ind. Equipment will be housed in a new building, the construction of which is now under way.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT (In Gross Tons)

	September		Nine Months Ended September	
	1929	1928	1929	1928
United Kingdom	651	2,225	31,838	39,552
British India	6,485	3,758	44,271	38,027
Germany .....	.....	.....	103	95
Netherlands	693	4,159	19,722	21,832
Canada	2,709	.....	3,472	378
France .....	.....	.....	101	300
Belgium .....	.....	.....	184	202
Norway	420	263	1,861	675
Sweden	25	.....	1,440	2,143
All others	30	32	602	1,573
Total	11,013	10,437	103,594	104,777

Machinery Markets and News of the Works

Tool Orders Trend Upward

October Bookings Are Likely To Exceed Those of September by Comfortable Margin

ALL machine tool centers report an improvement in sales the past week with the result that October bookings are likely to exceed those of September by a comfortable margin.

Inquiries also are in larger volume and give promise of a steady demand for equipment during the remainder of the year. The collapse in the stock market has not been discernible in business as it affects machine tool buying and in some quarters the opinion prevails that the good effects of easier money conditions may counterbalance whatever adverse results there may be.

Members of the National Machine Tool Builders' Association, assembled in annual convention last week at Briarcliff Manor, N. Y., were optimistic about the outlook and are confident that the months ahead will bring a steady flow of orders.

Although sales have been dis-

tributed among a wide range of industries and individual transactions have largely been confined to one to three tools each, the market has not been entirely devoid of buying on a sizable scale.

A New Jersey machinery manufacturer has bought a number of radial drills as well as other equipment and the Amtorg Trading Corporation has contracted for 26 lathes with a Cincinnati builder.

The Hercules Motor Co., Canton, Ohio, is expected to purchase a list of tools for expansion purposes. The general purchasing officer for the Panama Canal Zone is asking for bids on a planer, several drilling machines and lathes and miscellaneous mechanical supplies. Another user is in the market for six planers.

Business from the automobile industry has been of negligible proportions.

New York

NEW YORK, Oct. 29.—Machine tool business for October in the New York district will surpass that of September, when orders declined somewhat, presumably because of the National Machine Tool Exposition in Cleveland. The collapse in the stock market has not yet been discernible in business as it affects machine tool buying. In some quarters the opinion prevails that the good effects of easier money conditions may counterbalance whatever adverse results there may be.

A large order for radial drills and other equipment has been placed by a New Jersey machinery manufacturer. Otherwise, business has been in small, scattered lots, but the aggregate has been good. Inquiries are numerous, giving rise to expectations that the volume of machine tool buying will be well sustained over the remainder of the year.

Kohler Co., 711 Fifth Avenue, New York, manufacturer of sanitary ware, with main plant and headquarters at Kohler, Wis., has asked bids on general

contract for a six-story factory branch, storage and distributing plant at Long Island City, to cost over \$200,000 with equipment. Buchman & Kahn, 2 Park Avenue, New York, are architects.

Hudson Wire Co., Water Street, Ossining, N. Y., has begun superstructure for a one-story addition, 100 x 125 ft., for which general contract recently was let to Delfino & Sylvester, North Highland Avenue, to cost about \$75,000 with equipment.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for a six-story automobile service, repair and garage building, to cost about \$200,000 with equipment. Same architect has filed plans for two-story service, repair and garage building, 150 x 160 ft., to cost about \$100,000 with equipment.

Tomkins Brothers, 74 Passaic Street, Newark, N. J., building materials and supplies, have asked bids on general contract for a branch storage and distributing plant at Mount Vernon, N. Y., two stories, to cost about \$70,000 with conveying and mechanical-handling equipment. Robert Bolton, 45 Branford Place, Newark, is architect.

General Baking Co., 420 Lexington Avenue, New York, will install traveling

ovens, power, conveying and other equipment in connection with an expansion program during 1929-30, to cost \$8,000,000, including construction of six new baking plants and modernization of 12 other plants.

Third Avenue Railroad Co., 2396 Third Avenue, New York, has awarded general contract to J. D. Clermont, 145 East Forty-fifth Street, for two-story addition to motor bus parts and repair shop on West Farms Road, near 172nd Street, to cost about \$35,000. E. H. Faile & Co., 411 Lexington Avenue, are architects.

Board of Education, Park Avenue and Fifty-ninth Street, New York, is considering installation of manual training equipment in new Walton High School in Bronx, for which plans will be completed by W. C. Martin, school architect, Flatbush Avenue Extension and Concord Street, Brooklyn, to cost \$2,250,000.

Research Corporation, 25 West Forty-third Street, New York, manufacturer of air and gas cleaning apparatus, etc., has awarded general contract to Y. D. Bakker Co., Bound Brook, N. J., for one-story and basement addition to plant at Bound Brook, 50 x 80 ft., to cost about \$30,000 with equipment. John N. Pierson, 196 Jefferson Street, Perth Amboy, N. J., is architect.

Officials of General Motors Corporation, Broadway and Fifty-seventh Street, New York, and its affiliated organization, Fokker Aircraft Corporation, Hasbrouck Heights, N. J., have formed Dornier Corporation of America, Inc., a subsidiary, capitalized at 50,000 shares of stock, no par value, to manufacture Dornier flying boats, now being produced by Dornier Metallbauten, Friedrichshafen, Germany, and for which American rights have been secured. Plans are being considered for construction of aircraft plant for Dornier flying boats in New York district, including parts and assembling departments, to cost more than \$100,000 with equipment. Dr. Claude Dornier, head of Germany company, will be identified with new organization.

Steel Equipment Corporation, Avenel, N. J., manufacturer of steel shelving and other steel products, has plans for a two-story addition, to cost about \$45,000 with equipment.

Pennsylvania Dock Co., 25 Church Street, New York, affiliated with Pennsylvania Railroad Co., Pennsylvania Terminal, has awarded general contract to F. H. McGraw, Inc., 51 East Forty-second Street, for eight-story cold and dry storage and refrigerating plant, 230 x 900 ft., at Jersey City, N. J., to cost \$1,200,000 with equipment. George F. Bial, 147 Summit Avenue, Union City, N. J., is associate architect.

Accurate Engineering & Mfg. Co., 750 Summer Avenue, Newark, manufacturer of radio equipment and parts, has leased part of four-story building at Murray and Austin Streets for expansion.

National-Harris Co., 195 Verona Avenue, Newark, manufacturer of fine wires, etc., occupying part of former plant of

Heller Brothers File Works, Inc., has taken over another building for expansion in rolling division, increasing floor space to 30,000 sq. ft. Negotiations are under way for purchase of entire plant for wire manufacture. Early next year offices will be removed to building at Mount Prospect and Verona Avenues and vacated space equipped as new experimental laboratory. Francis R. Harris is president.

Seither & Ellis, Inc., 313 Halsey Street, Newark, heavy mill and hardware equipment and supplies, has purchased three-story and basement building, 50 x 100 ft., and will remodel for new storage and distributing plant. Possession will be taken in about 30 days. Present plant will be removed to new location.

Eastern Tool & Mfg. Co., 129 Bloomfield Avenue, Bloomfield, N. J., manufacturer of tools, wire goods, etc., has taken option on local property and contemplates new plant to cost more than \$70,000 with equipment.

Arcoil Oil Burner Co., 124 Commerce Street, Newark, manufacturer of oil burning equipment, aluminum fans, etc., has leased one-story factory at 81-83 Pennington Street, with option to purchase, for new plant.

Contract for operating mechanism of new Hackensack River freight line bridge has been awarded to Gears & Forgings, Inc., Cleveland. Bridge is of Waddell-Hardesty vertical lift type and is being erected for Pennsylvania Railroad.

South Atlantic

BALTIMORE, Oct. 28.—Plans are being considered by Williamsport Wire Rope Co., Williamsport, Pa., for one-story addition to plant at Sparrows Point, Baltimore, to cost about \$35,000 with equipment.

Baltimore Paper Box Co., Key Highway, Baltimore, manufacturer of corrugated paper boxes and containers, is planning establishment of branch factory at Salisbury, Md., and will take over existing building and install machinery during November, to cost about \$30,000.

Benedict Coal Co., St. Charles, Va., will carry out expansion at mining properties to cost about \$200,000, including addition to tipples, and surface and underground machinery.

Virginia Public Service Co., Charlottesville, Va., has acquired 12,000-acre tract at Greaver's Mill, near Covington, Va., as site for hydroelectric power development, for which plans will be placed under way at once. Plant will be equipped for capacity of 100,000 hp., and will cost about \$2,000,000 with transmission system. A. W. Higgins is president.

General Motors Corporation, Detroit, has plans for two-story service, repair and sales building at Baltimore, to cost over \$100,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect and engineer.

Schofield Co., 2 East Saratoga Street, Baltimore, manufacturer of silverware, metal plated goods, etc., is considering new three-story plant unit, to cost about \$65,000 with equipment.

In connection with electrification program in Philadelphia district, Pennsylvania Railroad Co., Philadelphia, has arranged with city of Baltimore for continuation of work in that section, extending from Wilmington, Del. Development will include construction of two large warehouses with mechanical-handling

The Crane Market

INQUIRY for overhead traveling cranes is light and buying in the past week has been small. In the locomotive crane field the Baltimore & Ohio Railroad has closed on two more 25-ton, Diesel-engine-driven locomotive cranes with the Industrial-Brownhoist Corporation, bringing the total number of this type of crane it has purchased this year to 10. The New York Central Railroad still has a 150-ton wrecking crane, 50-ton steam driven locomotive crane and 25-ton gasoline driven crane, pending award. The Chicago, Milwaukee & St. Paul has bought a 25-ton gantry crane for use in Chicago and will later order a duplicate for Milwaukee.

Among recent purchases are:

Sauerman Brothers, Chicago, 10-ton, 2-motor, overhead crane through H. C. Sturman & Co., from H. D. Conkey & Co.

Chicago, Milwaukee & St. Paul, 25-ton, 58-ft. span, gantry crane for Chicago, from Milwaukee Electric Crane & Mfg. Corporation.

facilities in Baltimore. Entire program will cost \$30,000,000.

Byars Mfg. Co., Thomasville, N. C., recently formed by George W. Byars, Thomasville, and associates, with capital of \$100,000, is planning operation of local factory to manufacture patented window screens and kindred products. L. C. Ripple, Thomasville, will be an official of new company.

Sylvania Corporation, Fredericksburg, Va., has superstructure in progress for local mill to manufacture transparent paper products, and expects to have initial unit ready for service in 60 to 90 days. Project will include a machine shop, power house and other mechanical divisions, and will cost about \$1,000,000 with equipment.

Appalachian Electric Power Co., Roanoke, Va., is planning extensions and improvements in steam-operated electric power plant at Logan, W. Va., including installation of boiler, stoker, mechanical fans and auxiliary equipment.

Haywood County Board of Education, Waynesville, N. C., is considering installation of manual training equipment in new high school at Canton, N. C., to cost about \$140,000, for which plans will be prepared by V. W. Breeze & Co., Castanea Building, Asheville, N. C., architects.

D. A. Stickell & Sons, Inc., Hagerstown, Md., plans rebuilding five-story flour mill and grain elevator destroyed by fire Oct. 13, loss including hoisting, conveying and other mechanical equipment.

Philadelphia

PHILADELPHIA, Oct. 28.—Morris Wheeler & Co., Inc., Thirtieth and Locust Streets, Philadelphia, iron and steel products, has plans for new one-story steel fabricating plant, 240 x 420 ft., to cost more than \$200,000 with equipment. Julian Simsohn, Broad Street and Girard Avenue, is architect and engineer.

Mack Machine Co., Inc., 1708 North Front Street, Philadelphia, manufacturer of ice and refrigerating machinery, has leased additional space at address noted and will use as an assembling plant.

Standard Oil Co., Sixth and Chestnut Streets, Philadelphia, has awarded general contract to Lutz & Co., Inc., 2218

Chestnut Street, for one-story storage and distributing plant at West Chester, Pa., to cost about \$40,000 with equipment.

I. Fischman & Sons, Inc., Tenth Street and Allegheny Avenue, Philadelphia, manufacturer of soda fountains and equipment, has leased part of former plant of Baldwin Locomotive Works, Fifteenth and Spring Garden Streets, for storage and distributing plant. Mechanical handling and other equipment will be installed.

Empire Art Metal Mfg. Co., Philadelphia, has been organized with capital of \$100,000 to take over and expand company of same name with plant at 3036 North Broad Street. Clarke D. and M. W. Hunter head new organization.

Stanley S. Cramer, Copewood and Thorne Streets, Camden, N. J., has filed plans for a one-story foundry, 40 x 85 ft., to cost about \$25,000 with equipment.

Pennsylvania Power & Light Co., Allentown, Pa., will build an addition to machine shop on Cedar Street, Harrisburg, Pa., and will make other improvements in equipment storage and distributing plant at that location, to cost about \$25,000.

City Council, Atlantic City, N. J., has plans for a two-story municipal equipment storage and distributing plant, with service, repair and garage building, to cost about \$75,000 with equipment. A. F. Amodio, New York and Atlantic Avenues, is architect.

Board of Education, Yardley, Pa., is considering installation of manual training equipment in new high school, to cost \$160,000, for which plans will be drawn by Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects.

New England

BOSTON, Oct. 28.—Machine tool business is better than in the previous few weeks, but no intimation is given as to when equipment under negotiation is likely to be closed. This is generally attributed to a falling off in manufacturing schedules of metal-working plants, the uncertainty of the automotive situation and to over-production in the airplane industry. Demand for used tools of certain types continues good, but sales are comparatively small, due to the scarcity of such equipment. New England machine tool dealers in general report that October sales were from a third to a half under those in September.

Small tool sales hold up well, but business is more or less handicapped by deliveries.

Bridgeport Boiler Works, Bridgeport, Conn., has plans for a one-story, addition, 146 x 100 ft.

Dupont Viscoloid Co., Leominster, Mass., has closed bids on six plant units. Motors and miscellaneous equipment will be purchased.

Electric Specialty Co., Stamford, Conn., is taking bids on a two-story addition, 44 x 120 ft. Bench and other small equipment will probably be purchased.

Brownsville Maine Slate Co., Brownsville, Me., has plans for revamping its plant and installation of new equipment at a cost of \$100,000.

Connecticut Department of Institutions has plans for a power house at State training school, Mansfield, Conn.

Fairfield County Ice Co., Stamford, Conn., is taking bids on a one-story ice

plant, 124 x 220 ft., requiring miscellaneous electrical and conveying equipment.

Terry Steam Turbine Co., Hartford, Conn., closed bids Oct. 29 on a boiler plant, 50 x 50 ft.

Norman Hoffman Bearing Corporation, Stamford, Conn., has closed bids on a manufacturing plant.

Chamber of Commerce, Bellows Falls, Vt., E. O. Squires, secretary, is at head of project to construct airport at North Charlestown, N. H., for service at first noted place, including hangar, repair and reconditioning shop and other field units, to cost more than \$60,000 with equipment.

Congdon & Carpenter Co., 155-73 Canal Street, Providence, R. I., iron and steel products, heavy hardware, etc., has awarded general contract to Charles B. Maguire Co., Grosvenor Building, for multi-story storage and distributing plant, 246 x 325 ft., to cost \$250,000 with equipment. Jenks & Ballou, New Industrial Trust Building, are architects and engineers.

Municipal Airport Committee of City Council, New Haven, Conn., has plans for municipal airport, with hangars, repair shops, oil storage and other units, to cost \$300,000 with equipment. Westcott & Mapes, 139 Orange Street, are architects and engineers.

International Silver Co., Meriden, Conn., is considering multi-story addition adjoining factory K, to cost more than \$100,000 with equipment.

Hood Rubber Co., Nichols Avenue, Watertown, Mass., has asked bids on general contract for a two-story addition, to cost about \$45,000 with equipment.

Bird Machine Co., South Walpole, Mass., manufacturer of paper mill machinery, parts, etc., has plans for one-story addition to cost about \$40,000 with equipment.

Pittsburgh

PITTSBURGH, Oct. 28.—Machinery business in this district is keeping up well. The problem of making deliveries, however, is still serious with some dealers, particularly on special tools. Railroad budgets for next year's purchases are being made up and local sales offices are taking keen interest in view of the fact that railroad tool purchases this year have not been nearly so large comparatively as those of industrial companies.

Sizable new inquiries have come out in the past week, and the aggregate of miscellaneous needs has been large. Purchases are also being made from time to time, but small orders predominate. The Westinghouse Electric & Mfg. Co. is buying against its fourth quarter list, but purchases probably will be scattered over the remainder of the year.

Plans are being considered by Columbia Radiator Co., Walnut Street, McKeesport, Pa., manufacturer of radiators, boilers, etc., for one-story foundry and machine shop, 100 x 200 ft., to cost over \$150,000 with equipment.

Allegheny River Mining Co., Kittanning, Pa., is planning early rebuilding of coal tippie at its Furnace Run mining properties, destroyed by fire Oct. 18.

Officials of Westinghouse Air Brake Co., Westinghouse Building, Pittsburgh,

are organizing Westinghouse Automotive Brake Co., to take over and expand automobile brake division of parent company. Increased production will be carried out.

Waddingham Tractor & Equipment Co., Webster Street, Bradford, Pa., manufacturer of motor tractors, parts, etc., has asked bids on general contract for two-story addition, 35 x 60 ft., to cost about \$40,000 with equipment. Hendryx & Benton, Tidewater Building, are architects.

Holgate Brothers Co., Holbros Building, Kane, Pa., manufacturer of broom blocks and kindred products, has awarded general contract to Hyde-Murphy Co., Ridgeway, Pa., for three-story addition, to cost about \$70,000 with equipment.

Officials of Randolph Planing Mill Co., Elkins, W. Va., recently formed by change of company name to West Virginia Flooring Co., increasing capital to \$350,000. Expansion will be carried out at hardwood flooring mill, including installation of electrically-operated equipment.

National Airways & Aircraft Co., Weirton, W. Va., recently formed by Danzil Martin, Weirton, and associates, is planning establishment of airport in Marland Heights district, including hangars, repair shops and other field units, to cost about \$70,000 with equipment. It is proposed to establish flying school later.

Pennsylvania Fireproofing Co., St. Marys, Pa., has awarded general contract to Truscon Steel Co., Youngstown, Ohio, for one-story addition, 40 x 175 ft., to be used in part for storage and distribution, to cost about \$50,000 with equipment.

Buffalo

BUFFALO, Oct. 28.—Consolidated Aircraft Corporation, 2050 Elmwood Avenue, Buffalo, is considering establishment of new plant to manufacture flying boats near Hampton Roads or Norfolk, Va., consisting primarily of assembling and testing works, to cost over \$100,000 with equipment. Lawrence D. Bell is general manager.

New York Central Railroad Co., Central Terminal, Buffalo, and 466 Lexington Avenue, New York, has awarded general contract to E. P. Muntz, Inc., Lehigh Valley Terminal Building, for engine terminal with repair and reconditioning facilities at Gardenville, N. Y., to cost about \$55,000 with equipment.

Board of Trustees, Cornell University, Ithaca, N. Y., has authorized construction of addition to steam power plant, including smokestack and equipment, to cost \$180,000.

Edwin R. Cooney, 762 Crescent Avenue, Buffalo, and associates have organized Cooney Refrigeration Co. and plan early operation of local factory for production of refrigerating equipment and devices. James L. Cooney, 221 Walton Street, Syracuse, N. Y., is interested in new organization.

Harrison Radiator Corporation, Washburn Street, Lockport, N. Y., a subsidiary of General Motors Corporation, is contemplating new plant in Ferndale district, Detroit, to manufacture automobile radiators and kindred automotive products, to cost more than \$200,000 with equipment. Site has been purchased.

Universal Wireless Communication Co., Inc., Liberty Bank Building, Buffalo, is arranging for increase in capital from 750,000 to 4,000,000 shares of stock, part of fund to be used for construction of

wireless broadcasting and receiving stations. G. Morton Wolfe, 1377 Main Street, is engineer.

Colonial Motor Coach Corporation, 133 West Water Street, Syracuse, N. Y., has plans for a one-story service, repair and garage building, to cost \$160,000 with equipment. F. F. Dressler, 140 South Dearborn Street, Chicago, is architect.

Samson-United Corporation, Rochester, N. Y., cutlery manufacturer, has bought local plant of Selden Truck Corporation and has started to equip for its main manufacturing plant. A. O. Samuels is president of Samson-United Corporation.

Detroit

DETROIT, Oct. 28.—Plans are under way by Dare Airplane Co., Detroit, for new aircraft manufacturing plant at Milan, Mich., where 400-acre tract has been secured, large part of site to be developed as airport. Factory unit will be two stories, 80 x 130 ft., for parts manufacture and assembling, to cost about \$65,000 with equipment. Executive offices will be maintained at Detroit. F. G. Dunn is vice-president.

Gar Wood, Inc., Algonac, Mich., manufacturer of speed motor boats, etc., will build new plant at Marysville, Mich., where 6-acre tract, with waterfront of 650 ft. on St. Clair River, has been secured through cooperation of Chamber of Commerce. Plans will be drawn for two one-story buildings, 70 x 550 ft. and 70 x 350 ft., to cost more than \$100,000 with equipment. Work is scheduled for completion in 90 days. Present plant will be removed to new location.

Board of Trustees, University of Detroit, Livernois Avenue and Six-Mile Road, will soon take bids for two-story addition to engineering building, to cost over \$90,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, Detroit, are architects.

Reynolds Spring Co., Jackson, Mich., has purchased Premier Cushion Spring Co., 5171 Bellevue Avenue, Detroit, manufacturer of automobile springs, and will consolidate. It is understood that Detroit plant will be continued. Purchasing company is arranging for increase in capital from 500,000 to 1,000,000 shares of stock, no par value, part of proceeds to be used for purchase and for expansion.

Bennett Pump Co., Muskegon, manufacturer of pumping machinery and parts, is planning one-story addition, totaling about 28,000 sq. ft. floor space, and will have unit ready for occupancy near end of year. Work is under way on another one-story extension providing about 24,000 sq. ft. floor area, entire project to cost about \$100,000 with equipment.

Pere Marquette Railroad Co., Grand Rapids, is planning to rebuild local car repair shops and equipment storage and distributing plant destroyed by fire Oct. 18. General offices are in Union Depot, Fort Street, Detroit.

Officials of Consolidated Cabinet Corporation, Greenville, have organized Consolidated Soda Fountain Corporation to take over and expand present organization. Company will use former local plant of Taplin Furnace Co. and remodel for early occupancy. Work on one-story addition will start at once, entire project to cost more than \$70,000 with equipment. Company will specialize in production of electrically-operated soda fountains and soda fountain equipment. Harold A. Hawn is president; and E. J. Thome, secretary and treasurer.

Detroit Show Case Co., 1654 West Fort Street, Detroit, manufacturer of show cases, store fixtures, etc., has plans for two-story addition, 60 x 125 ft., to cost more than \$60,000 with equipment. B. C. Wetzel & Co., Dime Bank Building, are architects.

American Forging & Socket Co., Pontiac, Mich., will build a larger and more modern plant at a location not yet determined. Because of development of new products, company expects a large expansion in its business during coming year. Directors on Oct. 21 declared a dividend of 35c. a share on common stock, bringing total for year to 80c. a share.

Norge Corporation, manufacturer of electric rotary refrigerators, a division of Borg-Warner Corporation, has moved into Detroit plant of Morse Chain Co., another Borg-Warner subsidiary. It will be in production Nov. 1.

Eclipse Interchangeable Counterbore Co., Detroit, has recently expended \$150,000 in adding to its manufacturing space and equipment at 7410 St. Aubin Avenue. A finished stock room has been completed in which a stock of counter-boring tools valued at \$150,000 is carried. R. G. Mitchell is general manager.

O. L. Anderson Co., Inc., Detroit, manufacturer of metal stampings and gasoline tanks for motor cars and motor boats, has purchased about 65,000 sq. ft. in B. E. Taylor industrial area as site for new plant, for which plans are being drawn.

Cleveland

CLEVELAND, Oct. 28.—Machine tool sales were fair the past week. The volume of business during October will show a gain over September. With some manufacturers, however, it will not be quite up to August. Business is mostly in single tools and is well distributed among various industries except the automotive industry. Automobile manufacturers are not expected to be in the market for much equipment during the remainder of the year. The Hercules Motor Co., Canton, Ohio, is inquiring for a round lot of machine tools for extensions. A fair amount of business is coming from the oil field industry.

Euclid Crane & Hoist Co., Cleveland, has awarded a contract to Truscon Steel Co. for an addition, 47 x 213 ft., one-fifth of space to be used for offices and remainder for manufacturing.

Columbia Metal Stamping & Die Co., Cleveland, has placed contract with J. L. Hunting Co. for a two-story plant, 90 x 200 ft. at Harvard Avenue and East 116th Street.

A 30 acre tract has been acquired by City Machine & Tool Co., Toledo, Ohio, for new plant, to cost more than \$150,000 with equipment.

Columbia Metal Stamping & Die Co., 1536 East Forty-ninth Street, Cleveland, has awarded general contract to H. K. Ferguson Co., Hanna Building, for one-story plant unit, 90 x 225 ft., to cost about \$100,000 with equipment.

National Washboard Co., 310 South Michigan Avenue, Chicago, is negotiating for purchase of washboard manufacturing works of Monarch Mfg. Co., Tiffin, Ohio, and its affiliated interest, Federal Washboard Co., Tiffin. It is proposed to remove plant to Chicago or other point. Monarch company will be reorganized and will develop local plant for another line

of production. Fred C. Cramer is president of Monarch company.

Stahl Auto Body Wagon & Spring Co., 5366 St. Clair Avenue, Cleveland, manufacturer of automobile bodies, springs, etc., is considering one-story addition, to cost more than \$40,000 with equipment.

Ric-Wil Co., Barberton, Ohio, manufacturer of door hangers and other hardware products, will build one-story addition, 60 x 80 ft., to cost about \$30,000 with equipment.

Sterling Grinding Wheel Co., Tiffin, Ohio, subsidiary of Cleveland Stone Co., Union Trust Building, Cleveland, has awarded general contract to Hossler Brothers, Tiffin, for two one-story additions. Work will be carried out in connection with an expansion program to cost \$100,000. George S. Rider Co., Century Building, Cleveland, is engineer.

Curtiss Flying Service, Inc., 39 Broadway, New York, has awarded general contract to A. M. Higley, Plymouth Building, Cleveland, for one and two-story hangar, with repair facilities, at Richmond Heights airport, near Cleveland, to cost about \$100,000 with equipment. Kenneth Franzheim, 345 Madison Avenue, New York, is architect.

Milwaukee

MILWAUKEE, WIS., Oct. 28.—Orders and pending business are well distributed throughout the metal-working industries. Automotive demand, however, is falling off, although local manufacturers of automotive parts have not curtailed generally. There is good demand from small machine shops and a revival of activity among makers of woodworking and sawmill machinery with considerable plant expansion projected. Export orders for large tools has increased from northern European countries. Deliveries threaten to become more remote.

Wrought Washer Mfg. Co., 46-54 South Bay Street, Milwaukee, will add three new one-story structures to building, 250 x 450 ft., recently purchased, which will include \$150,000 rerolling mill, 65 x 500 ft.; raw material storehouse, 65 x 385 ft., and shipping department building, 100 x 250 ft. Present equipment will be moved and new equipment, including cranes up to 15 tons capacity, added. Washers, stamping tools and dies will be produced at new plant. Fred Doepeke, Sr., is president and in charge.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., manufacturer of horizontal boring, milling and drilling machines, is planning to have German plants manufacture heavy parts of its machinery for European delivery. Only lighter and intricate parts will be shipped from Fond du Lac under this arrangement. H. B. Kraut, president and chairman of board, and K. F. Gallimore, chief engineer, are en route to Europe.

Pressed Steel Tank Co., Milwaukee, is building one-story addition to plant, 53 x 192 ft., at 5701 Greenfield Avenue, West Allis.

Filer & Stowell Co., 219 Becher Street, Milwaukee, have begun erection of one-story addition, 53 x 107 ft., to cost \$12,000.

J. G. Busch Co., 136 Ferry Street, Milwaukee, general machinist, is building shop addition, 31 x 62 ft.

Wausau Iron Works, 738 South Tenth Avenue, Wausau, Wis., snow plow manu-

facturer and fabricator of structural steel, is erecting an addition, 100 x 148 ft.

Central Chevrolet Agency, Hartford, Wis., has begun construction of garage and service building, two-stories, 74 x 118 ft.

Chain Belt Co., Milwaukee, will handle all foreign distribution of steel tubular towers and masts manufactured by Archer Iron Works, Chicago, which will retain its selling rights for United States and Alaska. Archer line will be sold abroad under Chain Belt Co.'s trade name Rex.

Parker Pen Co., Janesville, Wis., has acquired site at Toronto, for new Canadian plant. Present Toronto plant is leased. Work on the new plant will begin early in 1930.

Chicago

CHICAGO, Oct. 28.—Sales of machine tools are in larger volume, but dealers are still dependent for current business on covering a wide territory and centering on buyers who are seeking individual tools. The Milwaukee road is in the market for a coach wheel lathe, and the general purchasing officer for the Panama Canal Zone will buy a planer, a number of drilling machines, several lathes and miscellaneous mechanical supplies. Farm implement manufacturers are in the market for odd tools, some of which were not purchased when lists were closed earlier in the year. More extensive buying by this industry is said to be near at hand.

Supplies of used machines are more plentiful and demand is large. Dealers from the Pacific Coast are still making purchases in this market.

Uchtorff-Weiser Co., Davenport, Iowa, designer and manufacturer of dies and sheet metal products, will remove from 319 North Howell Street to Independent Products Co. building 209 North Howell Street, where a department for handling general machine repair work will be installed. Manufacture of metal cabinets will be added to company's lines.

Peoples Gas Light & Coke Co., 122 South Michigan Avenue, Chicago, will build a two-story compression building to cost \$25,000. R. Schenck, 122 South Michigan Avenue is architect.

Babson Mfg. Co., 2851 West Nineteenth Street, Chicago, manufacturer of barn equipment, dairy machinery, etc., has plans for immediate erection of one-story plant at St. Charles, Ill., to cost about \$70,000 with equipment.

Peoria Casket Co., Peoria, Ill., has awarded general contract to C. H. Tapping Construction Co., Jefferson Building, for two-story addition, to cost about \$70,000 with equipment. Jameson & Harrison, Peoria Life Building, are architects.

International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded general contract to W. A. Klinger, Inc., Warnock Building, Sioux City, Iowa, for two-story and basement factory branch, service and sales building at Sioux City, 150 x 225 ft., to cost about \$150,000 with equipment.

Peoria Malleable Castings Co., Alexander Street, Peoria, Ill., is considering three-story addition to cost about \$45,000 with equipment. It is understood that L. Eugene Robinson, Jefferson Building, architect and engineer, will prepare plans.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has plans for an addition to engine house at Mandan, N. D., with additional repair and machine shop facilities, to cost about \$40,000. O. M. Rognan, address noted, is company engineer.

Central Lime & Cement Co., 228 North LaSalle Street, Chicago, has acquired a 7-acre tract on Ninety-fifth Street, heretofore held by American Brake Shoe & Foundry Co., for establishment of storage and distributing plant, to cost more than \$100,000 with equipment.

Smith & Richardson Mfg. Co., Geneva, Ill., manufacturer of foundry supplies, etc., has awarded general contract to Wilson Brothers, Geneva, for one-story addition, to cost about \$25,000 with equipment.

Midwest Canning Corporation, Rochelle, Ill., is considering construction of new plant at Sleepy Eye, Minn., to cost over \$250,000 with automatic canning, conveying, sealing and other equipment.

Great Northern Railway Co., Railroad Building, St. Paul, Minn., is considering steam power plant at Great Falls, Mont., to use pulverized fuel, to cost about \$85,000 with equipment. Work will probably begin next year.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for factory branch, service and distributing plant at Chicago, where site, 107 x 174 ft., has been acquired, to cost about \$150,000 with equipment. Harold E. Gallup, 646 North Michigan Avenue, Chicago, is architect.

Royer Mfg. Co., Janesville, Wis., has leased, with option to buy, Caward-Dart building, Waterloo, Iowa, containing 20,000 sq. ft. floor space, for production of its Hawkeye maintainer and road equipment. Janesville plant will be continued for production of concrete mixers. Operations in Waterloo plant will start about Jan. 1.

Rockford Die & Tool Works, Rockford, Ill., has been incorporated with \$75,000 capital, and will establish plant at 1816 Seventeenth Avenue containing 5000 sq. ft. factory space. C. A. Dahlberg, J. R. Jernberg and A. F. West are organizers. Mr. Dahlberg has recently been elected president of Rockford Stamping & Tool Co.

Mattson Mfg. Co., will start work at once on branch factory at Manchester, Iowa, to extend its facilities in manufacture of highway snow fences. Company operates plants at Williamsport, Pa.; Joliet, Ill., and St. Paul, Minn.

Indiana

INDIANAPOLIS, Oct. 28.—Indiana & Michigan Electric Co., West Colfax Street, South Bend, has awarded general contract to H. G. Christman Co., 306 Notre Dame Avenue, for one-story addition to equipment storage and distributing plant, including repair division and remodeling of power house unit, to cost about \$80,000 with equipment.

Lilly Varnish Co., 670 South California Street, Indianapolis, has awarded a contract to Mothershead & Fitton, 960 North Pennsylvania Street, for one-story addition to raw material grinding mill, to cost about \$40,000 with equipment.

Studebaker Mall Order Co., South Bend, operating Colin B. Kennedy Corporation, manufacturer of radio equipment and other interests, has purchased substantial interest in Marvin Radio Tube Corporation, Irvington, N. J., manufacturer of radio apparatus, with four factories in

East and plant at Chicago. Plans are under way for a consolidation of plants at South Bend, where production will be concentrated and expanded. F. H. Wellington is vice-president and treasurer of purchasing company.

Board of Education, Terre Haute, is considering installation of manual training equipment in two-story addition to McLean Junior High School to cost \$200,000, for which bids will soon be asked on general contract. George J. Stoner & Co., Inc., Chanticleer Building, is architect.

Board of Trustees, Indiana Soldiers and Sailors Orphans' Home, Knightstown, has plans for new power house for central service, to cost about \$60,000 with equipment. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Rubush & Hunter, American Central Life Building, Indianapolis, architects, have awarded a general contract to A. V. Stackhouse Co., 2611 Cornell Avenue, for seven-story and basement automobile service, repair and garage building, 68 x 200 ft., to cost more than \$400,000 with equipment.

Servel, Inc., Evansville, manufacturer of electric and gas-operated refrigerating equipment, is arranging for increase in capital from 1,600,000 to 2,000,000 shares of stock, no par value, part of proceeds to be used for expansion in output. Company has purchased manufacturing rights for Electrolux refrigeration system.

Highland Iron & Steel Co., Terre Haute, is planning construction of new mill, 120 x 400 ft., to manufacture wrought iron window frame sections, to cost about \$150,000. Work will probably start early next spring.

Cincinnati

CINCINNATI, Oct. 28.—Demand for machine tools in this district increased the past week, dispelling the quietness that has prevailed recently. New business was well diversified, but orders were mostly for one or two standard machines. Production is being well maintained at capacity and in many instances factories are working night shifts in an effort to catch up on unfilled orders. Inquiries have also increased, with special tools in greater demand than heretofore. An unnamed buyer is inquiring for six planers.

The Russian Government placed an order the past week with a local builder for 26 lathes of various sizes. This inquiry has been pending for sometime, following a tour of inspection by a Russian commission early last summer.

Delco Products Co., 329 East First Street, Dayton, Ohio, manufacturer of isolated electric-lighting plants, automobile lighting and starting equipment, etc., has awarded general contract to Charles H. Shook, Third National Bank Building, for seven-story plant, to cost \$200,000 with equipment.

City Council, Middletown, Ohio, is considering a municipal airport, with hangar, repair shop and other field buildings, to cost about \$120,000 with equipment. City engineering department, City Hall, will be in charge.

Hill Auto Body & Metal Works, Inc., 822 Reedy Street, Cincinnati, is contemplating new one-story plant near Lunken municipal airport, to cost over \$40,000 with equipment.

Universal Steam Motors, Inc., Guaranty Bank Building, Lexington, Ky., John R. Humphrey, president, is planning construction of new one-story plant, including divisions for parts production and assembling, to cost over \$85,000 with equipment. It is expected to begin work early next year. George W. Hadden is general manager and chief engineer.

Dealers' Equipment & Implement Co., 1434 Riverside Avenue, Memphis, Tenn., farm and agricultural equipment, tools, etc., has plans for a one-story storage and distributing plant, 60 x 315 ft., to cost about \$30,000 with equipment. R. H. Rust is general manager.

Board of Education, Delaware, Ohio, is considering installation of manual training equipment in two-story high school to cost \$300,000, for which bids have been asked on general contract. Glass & Ramsey, 186 East Broad Street, Columbus, Ohio, are architects.

Procter & Gamble Co., Gwynne Building, Cincinnati, has plans for a steam power house at its St. Bernard plant, to cost about \$65,000 with equipment.

Clarksville Aviation Corporation Clarksville, Tenn., Collier W. Goodlett, president, has plans for hangar, 80 x 100 ft., with repair facilities, to cost about \$50,000 with equipment.

Tipton County Board of Education, Covington, Tenn., has approved plans for two-story vocational and agricultural building at Byar-Hall high school, to cost about \$70,000 with equipment. Anker F. Hansen, Shrine Building, Memphis, Tenn., is architect.

Gulf States

BIRMINGHAM, Oct. 28.—American Can Co., 602 North Cortez Street, New Orleans, has taken out a permit for a one-story addition, to cost about \$30,000 with equipment.

Texas & Pacific Railroad Co., Dallas, Tex., has work under way on ice-manufacturing plant at Lancaster yards, Fort Worth, Tex., to cost about \$200,000 with equipment.

Central Texas Refining Co., Dallas, Tex., a subsidiary of Cranfill-Reynolds, Inc., 1913 Commerce Street, Dallas, is contemplating new oil storage and distributing plant, to cost about \$45,000 with equipment.

Crane Co., 336 South Michigan Avenue, Chicago, has plans for three-story factory branch, storage and distributing plant, 100 x 105 ft., at Jacksonville, Fla., to cost more than \$80,000 with equipment. Marsh & Saxelby, Consolidated Building, Jacksonville, are architects.

Southern United Ice Co., McComb, Miss., has plans for extensions and improvements in plant, including installation of electrical equipment to replace present steam-operated machinery, entire project to cost more than \$50,000. Eugene Loch is local manager, in charge.

Laredo Truck & Implement Co., Laredo, Tex., recently organized by W. C. Lonquist, Laredo, and associates, plans storage and distributing plant, with repair and service department, to cost over \$40,000 with equipment.

Pan-American Aero Corporation, San Antonio, Tex., recently organized by Joseph Palmer, San Antonio, is negotiating with local Chamber of Commerce for site for local plant to manufacture air planes and parts, largely tri-motored passenger aircraft, designed by Mr. Palmer, to cost more than \$65,000 with

equipment. E. A. Reilly, San Antonio, is interested in new organization.

St. Louis-Southwestern Railway Co., Tyler, Tex., will soon begin construction of one-story car repair shop at local yards, to cost about \$40,000 with equipment. W. S. Hanley is chief engineer.

Board of City Trustees, Lafayette, La., is planning extensions and improvements in municipal electric light and power plant, including installation of new engine unit and auxiliary equipment. J. Frank Ard is chief engineer, in charge.

Dallas Power & Light Co., Dallas, Tex., has work under way on extensions and improvements in steam-operated electric generating plant, with installation of additional equipment, to cost more than \$1,000,000 with transmission lines.

International Flying Service, Inc., 521 Ingraham Building, Miami, Fla., is planning erection of several hangars at local airport, with shop and reconditioning facilities, units to be 100 x 100 ft., to cost about \$75,000 with equipment. Edward O. Smith is company engineer.

Board of Education, Hattiesburg, Miss., is planning installation of manual training equipment in new junior high school to cost about \$275,000, for which bids will be asked on general contract in about 30 days. Hull & Malvaney, Merchants Bank Building, Jackson, Miss., are architects.

Southern Air Transport, Inc., Fort Worth, Tex., will soon begin construction of two hangars, repair shops, oil storage and other field units at Grosvenor Field, near San Antonio, Tex., to cost more than \$100,000 with equipment. Company engineering department is in charge.

St. Louis

ST. LOUIS, Oct. 28.—Woods Brothers, Inc., 407 Security Building, Kansas City, Mo., manufacturer of airplanes and parts, has engaged Charles A. Smith, Finance Building, architect, to prepare plans for one-story plant at Rosecrans Field, St. Joseph, Mo., including parts manufacture and assembling departments, to cost about \$55,000 with equipment.

Thomas Poultry Car Co., a subsidiary of North American Car Co., 327 South LaSalle Street, Chicago, manufacturer of railroad cars, has leased property, 75 x 500 ft., at Springfield, Mo., for branch plant, including repair department, to cost about \$90,000 with equipment.

Pittsburgh Equitable Meter Co., Kennedy Building, Tulsa, Okla., with headquarters at 400 Lexington Avenue, Pittsburgh, manufacturer of gas and water meters, parts, etc., has plans for one-story factory branch and distributing plant, 50 x 150 ft., to cost about \$50,000 with equipment. Rush, Endacott & Goff, New Wright Building, Tulsa, are architects.

McCarthy Chevrolet Co., 6320 Delmar Boulevard, St. Louis, local representative for Chevrolet automobile, has acquired property, 110 x 185 ft., as site for new two-story service, repair and sales building, to cost over \$100,000 with equipment.

Board of Education, Coffeyville, Kan., is considering installation of manual training equipment in two and three-story high school, 185 x 390 ft., to cost \$400,000, for which bids will be asked on general contract early in November. Glen H. Thomas, Wheeler-Kelly-Hagney Building, Wichita, Kan., is architect.

Famo Feed Milling Co., 429 Cherokee Street, St. Joseph, Mo., has leased grain

elevator to be erected by local interests and will install conveying, hoisting, screening and other mechanical equipment, to cost about \$50,000. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are architects and engineers.

City Council, Russellville, Ark., has plans for new municipal electric light and power house, including installation of three Diesel engines, generators and accessory equipment, to cost about \$200,000 with machinery; fund has been approved. W. L. Winters, Merchants' National Bank Building, Fort Smith, Ark., is engineer.

Piston Ring Castings Co., Inc., St. Louis, recently formed by Henry Haacke, 5544 Maze Place, and associates, is arranging for new local plant to manufacture piston rings for automobile engines, etc., to cost about \$80,000 with machinery. Mr. Haacke will be president of new organization.

Pacific Coast

SAN FRANCISCO, Oct. 24.—Reliance Truck & Trailer Co., 1217 Stanyan Street, San Francisco, has filed plans for one-story plant, to cost about \$25,000 with equipment.

United States Electrical Mfg. Co., 200 East Slauson Avenue, Los Angeles, manufacturer of motors and other electrical equipment and supplies, has engaged Hamm, Grant & Bruner, Inc., Ferguson Building, architect and engineer, to prepare plans for one-story addition, 140 x 150 ft., to cost about \$60,000 with equipment.

Compton Union High School District, Compton, Cal., has authorized construction of a vocational shop at new high school group at Clearwater, to cost about \$125,000. Frank M. Goodwin, Stockwell Building, Compton, is architect. A similar shop unit will be constructed at high school group to be located at Willowbrook, to cost close to like amount, for which plans will be prepared by same architect.

General Electric Co., Schenectady, N. Y., has acquired 50-acre tract near San Carlos, San Mateo County, Cal., and is considering new plant for Pacific Coast trade, to cost more than \$1,000,000. Company is now operating two plants at Oakland, Cal. James A. Cranston is Pacific Coast manager.

Board of Public Works, Oakland, Cal., has plans for one-story municipal machine and repair shops, 200 x 200 ft., to cost about \$75,000 with equipment. L. C. and D. D. Stone, Great Western Power Building, Oakland, are architects.

General Electric Supply Co., Los Angeles, has leased a two-story building to be erected at Long Beach, Cal., 46 x 120 ft., and will use for equipment storage and distributing plant, to cost about \$25,000. W. Horace Austin, Pacific Southwest Bank Building, Long Beach, is architect.

Washington Electric Co., Seattle, a subsidiary of Puget Sound Power & Light Co., has secured Federal permission for hydroelectric power project on Columbia River, near Wenatchee, Wash., to develop total capacity of 84,000 hp., to cost about \$10,000,000 with steel tower transmission system and substations. Work is scheduled to begin soon. A. W. Leonard is president.

Hamilton Aero Mfg. Co., Los Angeles, has awarded general contract to Austin Co. of California, Inc., for one-story aircraft manufacturing plant at United

Airport, Burbank, with parts and assembling departments, to cost about \$27,000 with equipment.

Shaffer Tool Works, Brea, Cal., is erecting one-story addition to local plant, to cost about \$25,000 with equipment.

City Council, Fallon, Nev., is considering municipal electric light and power plant, to cost about \$100,000 with equipment. Work will be in charge of city engineering department.

Foreign

PLANS are under way by E. F. Houghton & Co., 240 West Somerset Street, Philadelphia, manufacturer of industrial oils, greases, etc., for new plant near Birmingham, England, to cost about \$100,000 with equipment. George Edwards, managing director, Edgar Vaughan & Co., Birmingham, British sales agents and distributors for Houghton company, will be active in new plant.

Edison General Italian Electric Co. (Societa Generale Italiana Edison di Elettricit ), Milan, Italy, has arranged for increase in capital from \$57,750,000 to \$70,875,000, part of proceeds to be used for expansion, including hydroelectric power developments and transmission line construction. A block of 140,000 shares of stock will soon be placed on market in United States.

Opel Motor Car Works, Russelheim, Germany, controlled by General Motors Corporation, Detroit, is planning expansion, including facilities for production of new type of car. It is said that parent company will expend more than \$1,000,000 for development of plant. I. J. Reuter, heretofore president and general manager of Olds Motor Works, Inc., Lansing, Mich., a division of General Motors Corporation, has been appointed managing director of Opel works.

United Sugar Co., Los Mochis, Mexico, has authorized expansion program to cost about \$500,000, including new units at cane sugar mill and installation of equipment for large increase in capacity.

Kreuger & Toll Co. (Aktiebolaget Kreuger & Toll), Stockholm, Sweden, operating Swedish Match Co., controlling International Match Co. and affiliated interests, and identified with Grangesberg Co., Stockholm, with extensive iron ore properties, is arranging for increase in capital covering a bond issue of 37,916,660 kroner (about \$9,480,000) and stock issue of 10,833,400 kroner (about \$2,710,000), a considerable part of fund to be used for acquisition of lumber and pulpwood properties in northern Sweden, comprising several going plants. Extensions will be carried out in last-noted line for wood supply for match interests and for pulpwood production for other lines.

New Trade Publications

Twist Drills.—New Process Twist Drill Co., Taunton, Mass. Catalog No. 29, listing dimensions and prices of hot-forged carbon and high-speed steel twist drills, bonding drills, track bits, jobbers drills, wire gage drills and other types. Manufacture of these drills is illustrated; useful information includes the proper grinding of drill points.

Turret Lathes and Balancing Machines.—Gisholt Machine Co., Madison, Wis. Service bulletins Nos. 1-15, with binder, describing and illustrating various production set-ups on the tur-

ret lathes and other machines built by the company. Bulletin No. 9, for example, shows an unusual forged-steel flywheel job on the Simplimatic, while others picture the machining of large elevator sheaves on the No. 4-L turret lathe and the cutting threads and other operations on airplane engine cylinders on the No. 1-L lathe. A five-position fixture for machining gate valves at one chucking on the Gisholt 3AL lathe is another job shown. The bulletins are issued at intervals.

Automatic Chucking Machine.—Goss & DeLeeuw Machine Co., New Britain, Conn. Eight-page folder illustrating and describing the new Quad-Radial work-rotating chucking machine, which combines a number of new features that exploit the possibilities of tungsten carbide cutting tools. Large illustrations show various details of the machine which was brought out at the Machine Tool Show and described in THE IRON AGE of Sept. 12.

Ball Bearing Manual.—Gurney Ball Bearing Division, Marlin-Rockwell Corporation, Jamestown, N. Y. Second edition of condensed handbook, 202 pages, 5 x 7½ in., intended to aid engineers in the selection and application of Gurney ball bearings. Dimensions and list prices are given on single row, radio thrust, duplex, double row and other types of ball bearings such as clutch throw-out, adapter type, narrow type and extra small radial bearings. A section is also devoted to thrust bearings. Engineering data include information required for computing loads on bearings, formulas for bearing loads, safety factors, limiting speeds, and the selection of type and size of bearings.

Squirrel-Cage Motors.—Louis Allis Co., Milwaukee. Bulletin 598 of 12 pages illustrates and describes a line of explosion-proof self-ventilated squirrel-cage motors of ¼ to 25 hp. designed for individual motor drive in hazardous industries. Illustrations include a number of installation views where there is an explosive atmosphere.

Electroplating Generator.—Columbia Electric Mfg. Co., 1292 East Fifty-third Street, Cleveland. Bulletin of 16 pages, illustrating and describing motor-generator sets for electroplating, electrotyping and electrochemical processes. These are made with ampere ratings from 300 to 10,000. Motor and generator are mounted on a common base and have flexible coupling.

Firebrick.—Laclede-Christy Clay Products Co., St. Louis. Folder of 4 pages referring to the 85 years of activity of this company, and showing some happenings in 1844, at the time the company was founded.

Electric Control Apparatus.—Allen-Bradley Co., Milwaukee. Four-page bulletin 740, devoted to a starting device for squirrel-cage motors in industrial use.

Motor Drives for Rolling Mills.—General Electric Co., Schenectady, N. Y. Bulletin 151-B of 64 pages lists motors supplied by this company for driving main rolls, to a total of 767 units, rated at 1,105,490 hp. The list is divided into groups according to type of mill and drive and the illustrations show a number of the units as installed.

Japanning, Enameling and Baking Ovens.—Despatch Oven Co., Minneapolis, Minn. Revised bulletins featuring gas and electric ovens for high-speed baking and drying of finishes of all kinds have been published.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

STOCKS declined violently in "speculators' panic," halted on worst day only by organized buying of representative issues by leading New York banks. Bonds, however, move to higher levels, and money rates are steady.

* * * * *

WHEAT declined 8c. during a week of rapid and disorderly selling. The Federal Farm Board, convinced that prices are lower than the world's supply of grain warrants (this year's harvest is 500,000,000 bushels smaller than last), has placed \$100,000,000 at the disposal of Farmers' National Grain Corporation, to insure that any grower can borrow a total of \$1.15 per bushel on grain delivered to cooperative elevators.

* * * * *

COTTON has received similar support which virtually pegs the price at about 16c. . . . A downward trend of most agricultural prices began early in October, responsive to heavy shipments and liberal stocks in storage. . . . Corn prices are firm.

* * * * *

BUSINESS generally is on a sound basis, President Hoover said, since commodity prices are stationary and inventories low despite a high rate of production and consumption and an upward trend in wages. . . . Retail trade is somewhat slower, wholesale and jobbing trade is fairly well maintained, and industry is improved, when compared with last week, although most lines are moderately slower than a year ago.

* * * * *

HEAVY engineering contracts totaled \$60,000,000, only two-thirds of corresponding week last year. However, structural fabricators are operating at practical capacity and shipyards are busiest since the war. . . . The Pennsylvania Railroad will extend its electrified zone south to Baltimore, but also has ordered 100 large steam locomotives for fast freight service.

* * * * *

INLAND waterways, intercoastal canals and St. Lawrence ship canal should be developed as a coordinated system, said President Hoover, during the celebration of the completion of the 9-ft. stage on the Ohio River. The annual cost of a 10-year program, in addition to current expenditures on rivers and harbors, will be about equal to half the cost of a battleship.

* * * * *

NINE fast trans-Atlantic liners are projected by six nations, the total cost being \$180,000,000. F. C.

Munson, president Munson Steamship Lines, calls this wasteful and uneconomic, as compared with what the same sum would do toward improving existing ships. . . . Freighters belonging to U. S. Shipping Board cut costs of voyage one-third by using cheap coal, pulverized. . . . Sale of operating lines and laid-up ships enables Government-owned Merchant Fleet Corporation to reduce next year's budget \$4,000,000. . . . The Russian ice-breaker Krassin returns with a convoy of 26 vessels from a 104-day cruise to Kara Sea, to trade with posts in northern Siberia.

* * * * *

FLYING records were broken by the Do-X. Its 12 500-hp. motors carried it for an hour 1200 ft. above Lake Constance, Switzerland, with 169 persons seated in a three-galleried fuselage and within the wings. . . . General Motors organizes a subsidiary to build such all-metal flying boats under Dornier license. . . . A Soviet-built plane arrives in the United States after an eventful trip from Russia. Another flies across the Himalayas on the Afghan border at an elevation of 17,500 ft. and temperature 70 below. . . . Air mail reaches New York from Buenos Aires, via west coast of South America, in 11 days, six days shorter than the fastest ship and rail time.

* * * * *

INDEPENDENT cigar makers and packers form an association to purchase raw materials and modern manufacturing machinery, as well as to conduct a national advertising campaign. . . . Paper and pulp industry in Wisconsin finances a graduate school at Lawrence College for advanced technical training, industrial research, and informational service on paper products. . . . A \$125,000,000 holding company acquires control of Kraft-Phenix Cheese Corporation, Hershey Chocolate Corporation and Colgate-Palmolive-Peet Co.

* * * * *

PETROLEUM production remains near its peak figure, despite a 20-per cent voluntary restriction by Oklahoma producers. . . . California crude was reduced about 75c. per barrel, since the gas conservation law did not restrict the production of oil as expected. In that State 800,000,000 cu. ft. of natural gas is blown into the air daily, twice as much as is used. . . . Utilization of natural gas is increasing throughout the country at the rate of 8 per cent a year; 4,500,000 customers now use it for fuel.